Drinking Water Surveillance Program

# RENFREW WATER TREATMENT PLANT

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# RENFREW
# WATER TREATMENT PLANT

## DRINKING WATER SURVEILLANCE PROGRAM

## ANNUAL REPORT 1989

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# EXECUTIVE SUMMARY

## DRINKING WATER SURVEILLANCE PROGRAM

## RENFREW WATER TREATMENT PLANT
## 1989 ANNUAL REPORT

The Drinking Water Surveillance Program (DWSP) for Ontario is a monitoring program providing immediate, reliable, current information on drinking water quality. The DWSP officially began in April 1986 and is designed to eventually include all municipal supplies in Ontario. In 1987, there were 65 supplies being monitored.

The Renfrew Water Treatment Plant treats water from the Bonnechere River using conventional treatment. The process consists of coagulation, flocculation, sedimentation, filtration and disinfection. The Renfrew plant has a design capacity of 19.0 X 1000 $M^3$/day and supplies a population of approximately 8,000.

Water samples from the plant: raw and treated and two distribution system sites were taken on a monthly basis beginning in March and analysed for 180 parameters. Parameters were divided into the following groups: Bacteriological, Inorganic and Physical (Laboratory Chemistry, Field Chemistry and Metals) and Organic (Chloroaromatics, Chlorophenols, Pesticides and PCB, Phenolics, Polynuclear Aromatic Hydrocarbons, Specific Pesticides and Volatiles). Chlorophenols and Specific Pesticides were analysed in June and November only.

A summary of results is shown in Table A.

Inorganic and Physical parameters were below any applicable health related ODWOs.

Of a total of approximately 110 Organic parameters tested for on a monthly basis, none exceeded health related guidelines.

During 1989 the DWSP sampling results indicated that the Renfrew Water Treatment Plant produced good quality water at the plant and this quality was maintained in the distribution system.

# DRINKING WATER SURVEILLANCE PROGRAM

## RENFREW WATER TREATMENT PLANT
## 1989 ANNUAL REPORT

### INTRODUCTION

The Drinking Water Surveillance Program (DWSP) for Ontario is a monitoring program providing immediate, reliable, current information on drinking water quality. The DWSP officially began in April 1986 and is designed to eventually include all municipal supplies in Ontario. In 1987, there were 65 supplies being monitored. Appendix A carries a full description of the DWSP.

The DWSP was initiated for the Renfrew Water Treatment Plant in March of 1989.

This report contains information and results for 1989.

### PLANT DESCRIPTION

The Renfrew Water Treatment Plant is a conventional treatment plant that treats water from the Bonnechere River. The process consists of coagulation, flocculation, sedimentation, filtration, disinfection and fluoridation. Calcium Carbonate is added for pH adjustment and Powdered Activated Carbon is added for taste and odour control. The Renfrew plant has a design capacity of 19.0 X

1000 $M^3$/day and flows for day of sampling ranging from 4.6 x 1000 $m^3$/day to 7.0 x 1000 $m^3$/day. The plant serves a population of approximately 8,000.

The plant location is shown in Figure 1. Plant process details, in a block schematic, are shown in Figure 2. General plant information is presented in Table 2.

SAMPLE LOCATIONS

Water samples were obtained from four DWSP approved locations;

i) Raw - The water originated from the lowlift discharge prior to chlorination and was sampled through stainless steel sample line. The sample taps is located on the lowlift discharge line inside the main building.

ii) Treated - The water originated from the highlift pump well after addition of all treatment chemicals and was sampled through a stainless steel sample line. The sample tap is located on the highlift discharge line.

iii) Site 1 - The distance that this site is from the plant is unavailable, as is the type of plumbing and the sample tap location.

iv) Site 2 - The distance that this site is from the plant is unavailable, as is the type of plumbing and

the sample tap location.

## SAMPLING AND ANALYSES

Sample lines in the plant were flushed prior to sampling to ensure that the water obtained was indicative of its origin and not residual water standing in the sample line.

At all distribution system locations two types of samples were obtained: a standing and a free flow. The standing sample consisted of water that had been in the household plumbing and service connection for a minimum of six hours. These samples are used to make an assessment of the amount by which the levels of inorganic compounds and metals may be changed on standing, due to leaching from (or deposition on), the plumbing system. The only analysis carried out on the standing samples therefore, are General Chemistry and Metals. The free flow sample represented fresh water from the distribution main that had been flowing at the sample tap for five minutes before being sampled.

Attempts were made to capture the same block of water at each sampling point by taking the retention time into consideration. The retention time was calculated by dividing the volume of water between the two sampling points by the sample day flow. For example, if it was determined that the retention time within the plant was five hours then there would be a five hour interval

between the raw and treated sampling. Similarly, if it was estimated that it took approximately one day for the water to travel from the plant to the distribution system site, this site would be sampled one day after the treated water from the plant.

Stringent DWSP sampling protocols were followed to ensure that all samples were taken in a uniform manner.

Plant operational personnel perform analyses on parameters for process control (Table 1).

The Renfrew Water Treatment Plant, raw and treated water and two distribution system locations were sampled for approximately 180 parameters on a monthly basis beginning in March. The Specific Pesticides and Chlorophenols scans were sampled in June and November only. Polynuclear Aromatic Hydrocarbons and Phenolics are only analysed in the raw and treated water at the plant. As of August the triazine pesticides were only analyzed in the raw and treated water. Laboratory analysis was conducted at the Ministry of the Environment facilities in Rexdale, Ontario.

## RESULTS

Field measurements were recorded on the day of sampling and were entered onto the DWSP data base as submitted by plant personnel.

FIGURE 1

# DRINKING WATER SURVEILLANCE PROGRAM

## SITE LOCATION MAP

### RENFREW WATER TREATMENT PLANT

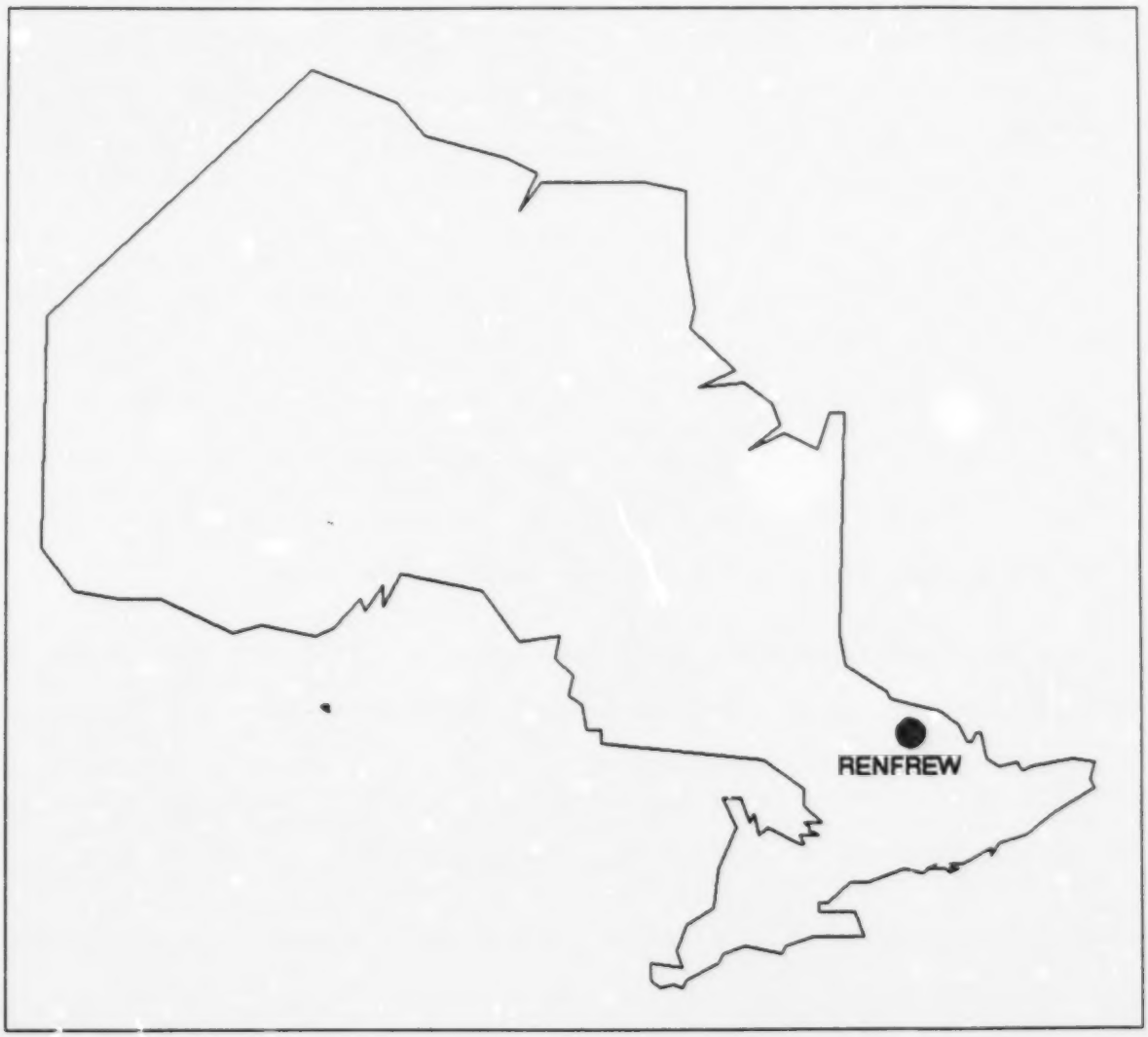
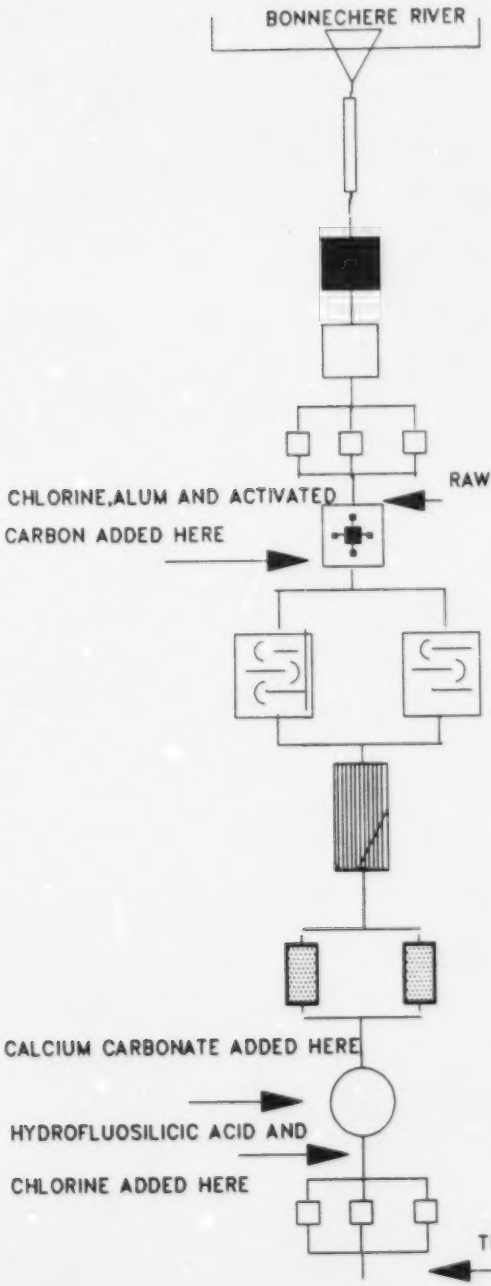


FIGURE 2

# RENFREW WTP

## SCHEMATIC DIAGRAM




## CHARACTERISTICS

1 WOOD WITH ROCK FILLING CRIB

1 CONCRETE INTAKE PIPE

1 CONCRETE SCREEN CHAMBER

1 CONCRETE LOWLIFT CHAMBER

3 LOWLIFT PUMPS

1 CONCRETE FLASH MIXER

2 CONCRETE FLOCCULATION TANKS

1 SETTLING TANK
WITH TUBE SETTLERS

2 CONCRETE FILTER TANKS

1 CONCRETE CLEAR WELL

3 HIGHLIFT PUMPS

TABLE 1

DRINKING WATER SURVEILLANCE PROGRAM ANNUAL REPORT

IN-PLANT MONITORING RENFREW WATER TREATMENT PLANT 1989

| PARAMETER | LOCATION | FREQUENCY |
|---|---|---|
| Alkalinity | Wet Well | weekly |
| | Clear Well | weekly |
| Aluminum | Clear Well | weekly |
| Chlorine Residual - free | Before Filters | daily |
| | After Filters | daily |
| - total | Before Filters | daily |
| | After Filters | daily |
| Colour | Wet Well | daily |
| | Clear Well | daily |
| Fluoride | Wet Well | daily |
| | Clear Well | daily |
| pH | Wet Well | daily |
| | Clear Well | daily |
| Temperature | Wet Well | daily |
| | Clear Well | daily |
| Turbidity | Wet Well | daily |
| | Clear Well | daily |

TABLE 2

DRINKING WATER SURVEILLANCE PROGRAM ANNUAL REPORT

GENERAL INFORMATION

RENFREW WATER TREATMENT PLANT

| | |
|---|---|
| LOCATION: | 244 McANDREW STREET<br>RENFREW, ONTARIO<br>K7V 3X3<br>(613-432-3501) |
| SOURCE: | RAW WATER SOURCE - BONNECHERE RIVER |
| DESIGN CAPACITY: | 19.0 x 1000$M^3$/DAY |
| OPERATION: | MINISTRY |
| PLANT SUPERINTENDENT: | D. McHUGH |
| MINISTRY REGION: | SOUTHEAST |
| DISTRICT OFFICER: | MR. R. DUNN |

| MUNICIPALITY SERVED | POPULATION |
|---|---|
| RENFREW | 7,914 |

Table 3 contains information on the sample day retention time, flow rate and treatment chemicals used and their associated dosages.

Table 4 is a summary break-down of the number of water samples analysed by parameter and by water type. The number of times that a positive or trace result was detected is also reported.

Positive denotes that the result is greater than the statistical limit of detection established by the Ministry of the Environment (MOE) laboratory staff and is quantifiable. Trace (<T) denotes that the level measured is greater than the lowest value detectable by the method but lies so close to the detection limit that it cannot be confidently quantified.

Table 5 presents the results for parameters detected on at least one occasion.

Table 6 lists all parameters analysed in the DWSP.

Associated guidelines and detection limits are also supplied on tables 5 and 6. Parameters are listed alphabetically within each scan.

## DISCUSSION

### General

Water quality is judged by comparison with the Ontario Drinking Water Objectives (ODWO's) as defined in the 1984 publication (ISBN 0-7743-8985-0). The Province of Ontario has health related and aesthetic objectives for 49 parameters, these are currently under review. When an ODWO is not available guidelines/limits from other agencies are consulted. The Parameter Listing System (PALIS) recently published (ISBN 0-7729-4461-X) by the MOE catalogues and keeps current over 1750 guidelines for 650 parameters from agencies throughout the world.

Although some of the parameters measured on DWSP may be present in the raw and treated water as a result of pollution, many of the compounds detected are naturally occuring or are treatment by-products.

Plant operational personnel address occurrences of taste and odour or biological water quality parameters. The DWSP does not assess these aspects of the water supply.

As stated under Results, traces do not indicate quantifiable results as defined by established MOE laboratory analytical reporting protocols. While they can be useful in trend analysis or confirmation of the presence of a specific contaminant that is

repeatedly detected at these levels, the occasional finding of a trace level of a contaminant is not considered to be significant. **DISCUSSION OF GUIDELINES AND LIMITS THEREFORE, IS ONLY CONDUCTED ON POSITIVE RESULTS.**

Bacteriology

Positive results for the Bacteriology scan were present seven times in the treated water, nine times in the Site 1 water and fourteen times in the Site 2 water. The positive parameters were Standard Plate Count and Total Coliform Background.

Standard Plate Count is a test used to supplement routine analysis for Coliform bacteria. The limit for Standard Plate Count (at 35°C after 48 hours) in the ODWOs is 500 organisms per mL (based on a geometric mean of 5 or more samples). High Standard Plate Counts were present in two Site 2 water samples. While no indicators of unsafe water were detected at this time, the high Standard Plate Count may generally be a result of the higher temperatures in the summer months.

Guidelines for bacteriological sampling and testing of a supply are developed to maintain a proper supervision of its bacteriological quality; the routine monitoring program usually requires the taking of multiple samples in a given system. Full interpretation of bacteriological quality cannot be made on the basis of single

samples. Further, bacteriological limits were developed in acknowledgement that the presence of coliforms may be detected due to their non-uniform distribution throughout the distribution system and the fact that their enumeration is subject to considerable variation. Routine bacteriological monitoring, as outlined in the ODWOs is carried out by the operating authority.

Inorganic and Physical

**Laboratory and Field Chemistry**

The results for the Laboratory Chemistry and Field Chemistry scans were below any applicable health related ODWOs.

The aesthetic ODWO of 5 True Colour Units (TCU) was exceeded twice in the treated water, the Site 1 free flow water and the Site 2 free flow water. Colour in drinking water may be due to the presence of natural or synthetic organic substances as well as certain metallic ions.

It is desirable that the Temperature of drinking water be less than 15°C; the palatability of water is enhanced by its coolness. A temperature below 15°C will tend to reduce the growth of nuisance organisms and hence minimize associated taste, colour, odour and corrosion problems. The temperature of the delivered water may increase in the distribution system due to the warming effect of the soil in late summer and fall and/or as a result of higher

temperatures in the source water. The desired ODWO was exceeded from June through to September.

The ODWO recommend a hardness level of between 80 and 100 mg/L as calcium carbonate for domestic waters, to provide an acceptable balance between corrosion and incrustation. Water supplies with a hardness greater than 200 mg/L are considered poor, and would possess a tendency to form scale deposits and result in excessive soap consumption. The treated plant water had hardness values ranging from 65 mg/L to 144 mg/L.

The Langelier Index is used extensively in estimating the corrosion potential of water. An increasingly negative index indicates the increasing possibility of corrosion. It is considered sound engineering practice to maintain a slightly positive Langelier Index. The Langelier Index for Renfrew is negative six out of ten times.

As part of the treatment plant process, hydrofluosilicic acid is added to the treated water (Table 3). Where fluoridation is practiced, the Fluoride concentration recommended on the ODWO is 1.2 mg/L, plus or minus 0.2 mg/L. This level was maintained in the treated and distributed water.

Turbidity in water is caused by the presence of suspended matter such as clay, silt, colloidal particles, plankton and other

microscopic organisms. The most important potential health effect of Turbidity is its interference with disinfection in the treatment plant and the maintenance of a chlorine residual. The ODWO of 1 Formazin Turbidity Unit (FTU) is only applicable to treated water leaving the plant; the limit was not exceeded.

**Metals**

The results reported for the Metals scan were below any applicable health related ODWOs.

Iron and Manganese levels were lower in the treated water as compared to the raw water. This is a result of the treatment process. The addition of Alum as a coagulant to the raw water and the resulting coagulation/settling process has been shown to reduce the levels of most metals.

Elevated levels of Cadmium, Copper, Lead, Nickel and Zinc were detected in the standing samples as compared to the free flow distribution samples, indicating that small quantities of these metals were leached from the household plumbing as the water stood overnight. The Langelier Index indicates potential for corrosion.

At present, there is no evidence that Aluminum is physiologically harmful and no health limit for drinking water has been specified. The measure of residual Aluminum in the treated water is important to indicate the efficiency of the treatment process. The ODWOs

indicate that a useful guideline is to maintain a residual below 100 µg/L as Al in the water leaving the plant to avoid problems in the distribution system. Aluminum values exceeded the ODWO operational guideline four times in the plant treated water.

The wide variation in Aluminum values between the raw water and the treated water is an indication of changing water quality in the Bonnechere River. The variation in Aluminum values between the treated water and the distributed water indicates that attempts to catch the same block of water have not been successful.

Organic Parameters

**Chloroaromatics**

The results of the Chloroaromatics scan showed that no chloroaromatics were detected.

**Chlorophenols**

The results of the Chlorophenols scan showed that no Chlorophenols were detected.

The maximum desirable concentration of phenolic substances in drinking water is 2.0 µg/L. This limit has been set primarily to prevent the occurrence of undesirable tastes and odours, particularly in chlorinated water. Phenolics were detected at levels ranging from 0.8 to 3.0 µg/L in the raw water and 0.8 to

2.6 µg/L in the treated water.

**Pesticides and PCB (Polychlorinated Biphenyls)**

The results of the Pesticides and PCB scan showed that no PCBs were detected and that one pesticide was detected:

Alpha BHC

There are several isomers of BHC (Benzene Hexachloride); gamma BHC is the active ingredient of the pesticide Lindane; while alpha BHC is the isomer predominantly found in surface waters from the Great Lakes Basin as indicated in results from other water supplies on DWSP.

Alpha BHC was detected at trace levels, twice in the raw water, twice in the treated water, three times in the Site 1 water and twice in the Site 2 water.

**Specific Pesticides**

Results of the Specific Pesticides scan showed that no specific pesticides were detected.

**Polynuclear Aromatic Hydrocarbons (PAHs)**

The results of the PAH scan showed that no PAHs were detected.

**Volatiles**

The results of the Volatiles scan showed that nine parameters, other than Trihalomethanes(THMs), were detected:

Benzene

Toluene

Ethylbenzene

M-Xylene

O-Xylene

Styrene

1,1,1 Trichloroethane

1,4 Dichlorobenzene

1,2 Dichlorobenzene

Benzene was detected at trace levels, once in the treated water and twice in the Site 1 water.

The detection of toluene at low, trace levels is a laboratory artifact derived from the analytical methodology.

Ethylbenzene was detected at trace levels, once in the raw water, five times in the treated water, three times in the Site 1 water and once in the Site 2 water.

Meta-Xylene (M-Xylene) was detected at trace levels, once in the treated water and the Site 1 water.

Ortho-Xylene (O-Xylene) was detected at trace levels, twice in the treated water and the Site 1 water.

The detected trace levels of Styrene are also considered to be laboratory artifacts resulting from the polystyrene shipping containers. The sporadic background levels from this source are in the order of 0.05 µg/L.

The volatiles listed above are typically found on an occasional basis at other water supplies included on the DWSP.

1,1,1 Trichloroethane was detected at trace levels, twice in the raw water.

1,4 Dichlorobenzene was detected at trace levels, twice in the treated water, twice in the Site 1 water and once in the Site 2 water.

1,2 Dichlorobenzene was detected at a trace level in one treated water sample.

THMs are acknowledged to be produced during the water treatment process and will always occur in chlorinated surface waters. THMs are comprised of Chloroform, Chlorodibromomethane and Dichlorobromomethane. Bromoform occurs occasionally. Results are reported for the individual compounds as well as for total THMs.

Chloroform, Dichlorobromomethane and Total THMs were detected in all treated water samples. Chlorodibromomethane was detected at trace levels in most treated water samples. Bromoform was not detected. All Total THM occurrences, ranging from 32.5 to 69.1 µg/L were well below the ODWO of 350 µg/L.

The occurrence of trihalomethanes in the July and August raw water samples may be as a result of back pressure and a leaking check valve in the lowlift discharge line when the lowlift pumps were turned off.

## CONCLUSIONS

The Renfrew Water Treatment Plant for the sample year of 1989 produced good quality water at the plant and this quality was maintained in the distribution system.

No health related guidelines, for organic or inorganic parameters, were exceeded during 1989.

## RECOMMENDATIONS

Two recommendations can be made:

1) During 1989 two raw water samples contained trihalomethanes. The lowlift pumps should be running for at least fifteen minutes

before DWSP samples are taken.

2) Attempts should be made to ensure that the same block of water is being sampled in the distribution system.

TABLE 3

DRINKING WATER SURVEILLANCE PROGRAM RENFREW WTP SAMPLE DAY CONDITIONS FOR 1989

| | SAMPLE DAY CONDITIONS | | TREATMENT CHEMICAL DOSAGES (MG/L) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | PRE-CHLORINATION | COAGULATION | FLUORIDATION | POST PH ADJUSTMEN | | POST-CHLORINATION |
| DATE | DELAY* TIME(HRS) | FLOW (1000M3) | CHLORINE | ALUM LIQUID | HYDROFLUOSILICIC ACID | CALCIUM CARBONATE | CALCIUM HYDROXIDE | CHLORINE |
| MAR 10 | 1.7 | 5.5 | .95 | 41.20 | 1.20 | 12.70 | . | .79 |
| APR 10 | 1.7 | 5.4 | 1.25 | 46.72 | 1.30 | 13.50 | . | .60 |
| MAY 08 | 1.7 | 4.8 | 1.30 | 41.00 | 1.20 | 10.50 | . | .60 |
| JUN 13 | 2.0 | 5.1 | 1.27 | 52.09 | 1.60 | 12.00 | . | 1.00 |
| JUL 11 | 1.7 | 7.0 | 1.44 | 42.78 | 1.50 | 13.20 | . | .70 |
| AUG 15 | .2 | .0 | 1.31 | 47.00 | 1.20 | 8.00 | . | .60 |
| SEP 12 | .7 | 6.8 | 1.16 | 48.50 | 1.30 | 8.90 | . | .57 |
| OCT 11 | .7 | 5.4 | 1.26 | 46.80 | 1.40 | 10.10 | . | .87 |
| NOV 15 | 1.0 | 5.0 | 1.23 | 52.50 | 1.40 | 8.60 | . | .81 |
| DEC 12 | 1.1 | 4.6 | 1.30 | 55.10 | 1.40 | . | 9.70 | .90 |

* THE DELAY TIME BETWEEN THE RAW AND TREATED WATER SAMPLING, SHOULD ESTIMATE THE RETENTION TIME.

TABLE 4

DRINKING WATER SURVEILLANCE PROGRAM RENFREW

SUMMARY TABLE OF RESULTS (1989)

| SCAN | PARAMETER | RAW | | | TREATED | | | SITE 1 | | | SITE 2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | TOTAL | POSITIVE | TRACE | TOTAL | POSITIVE | TRACE | TOTAL | POSITIVE | TRACE | TOTAL | POSITIVE | TRACE |
| BACTERIOLOGICAL | FECAL COLIFORM MF | 10 | 9 | 0 | . | . | . | . | . | . | . | . | . |
| | STANDRD PLATE CNT MP | . | . | . | 10 | 2 | 0 | 10 | 5 | 0 | 10 | 6 | 0 |
| | TOTAL COLIFORM MF | 10 | 8 | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 10 | 0 | 0 |
| | T COLIFORM BCKGRD MF | 10 | 9 | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 10 | 5 | 0 |
| *TOTAL SCAN BACTERIOLOGICAL | | 30 | 26 | 0 | 30 | 2 | 0 | 30 | 5 | 0 | 30 | 11 | 0 |
| *TOTAL GROUP BACTERIOLOGICAL | | 30 | 26 | 0 | 30 | 2 | 0 | 30 | 5 | 0 | 30 | 11 | 0 |
| CHEMISTRY (FLD) | FLD CHLORINE (COMB) | 1 | 1 | 0 | 10 | 10 | 0 | 17 | 17 | 0 | 14 | 14 | 0 |
| | FLD CHLORINE FREE | 1 | 1 | 0 | 10 | 10 | 0 | 19 | 19 | 0 | 19 | 19 | 0 |
| | FLD CHLORINE (TOTAL) | 1 | 1 | 0 | 10 | 10 | 0 | 19 | 19 | 0 | 19 | 19 | 0 |
| | FLD PH | 9 | 9 | 0 | 9 | 9 | 0 | 19 | 19 | 0 | 20 | 20 | 0 |
| | FLD TEMPERATURE | 10 | 10 | 0 | 10 | 10 | 0 | 20 | 20 | 0 | 20 | 20 | 0 |
| | FLD TURBIDITY | 10 | 10 | 0 | 10 | 10 | 0 | 20 | 20 | 0 | 20 | 20 | 0 |
| *TOTAL SCAN CHEMISTRY (FLD) | | 32 | 32 | 0 | 59 | 59 | 0 | 114 | 114 | 0 | 112 | 112 | 0 |
| CHEMISTRY (LAB) | ALKALINITY | 10 | 10 | 0 | 10 | 10 | 0 | 20 | 20 | 0 | 20 | 20 | 0 |
| | CALCIUM | 10 | 10 | 0 | 10 | 10 | 0 | 20 | 20 | 0 | 20 | 20 | 0 |
| | CYANIDE | 10 | 0 | 0 | 10 | 0 | 0 | 10 | 0 | 0 | 10 | 0 | 0 |
| | CHLORIDE | 10 | 10 | 0 | 10 | 10 | 0 | 20 | 20 | 0 | 20 | 20 | 0 |
| | COLOUR | 10 | 10 | 0 | 10 | 7 | 3 | 20 | 19 | 1 | 20 | 20 | 0 |
| | CONDUCTIVITY | 10 | 10 | 0 | 10 | 10 | 0 | 20 | 20 | 0 | 20 | 20 | 0 |

TABLE 4

DRINKING WATER SURVEILLANCE PROGRAM RENFREW

SUMMARY TABLE OF RESULTS (1989)

| SCAN | PARAMETER | SITE RAW TOTAL | RAW POSITIVE | RAW TRACE | TREATED TOTAL | TREATED POSITIVE | TREATED TRACE | SITE 1 TOTAL | SITE 1 POSITIVE | SITE 1 TRACE | SITE 2 TOTAL | SITE 2 POSITIVE | SITE 2 TRACE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CHEMISTRY (LAB) | FLUORIDE | 10 | 10 | 0 | 10 | 10 | 0 | 20 | 20 | 0 | 20 | 20 | 0 |
| | HARDNESS | 10 | 10 | 0 | 10 | 10 | 0 | 20 | 20 | 0 | 20 | 20 | 0 |
| | IONCAL | 10 | 10 | 0 | 10 | 10 | 0 | 20 | 20 | 0 | 20 | 20 | 0 |
| | LANGELIERS INDEX | 4 | 4 | 0 | 4 | 3 | 0 | 6 | 6 | 0 | 7 | 7 | 0 |
| | MAGNESIUM | 10 | 10 | 0 | 10 | 10 | 0 | 20 | 20 | 0 | 20 | 20 | 0 |
| | SODIUM | 10 | 10 | 0 | 10 | 10 | 0 | 20 | 20 | 0 | 20 | 20 | 0 |
| | AMMONIUM TOTAL | 10 | 5 | 4 | 10 | 1 | 4 | 20 | 2 | 12 | 20 | 2 | 9 |
| | NITRITE | 10 | 2 | 8 | 10 | 1 | 7 | 20 | 2 | 18 | 20 | 2 | 18 |
| | TOTAL NITRATES | 10 | 7 | 2 | 10 | 6 | 3 | 20 | 13 | 5 | 20 | 14 | 2 |
| | NITROGEN TOT KJELD | 10 | 10 | 0 | 10 | 10 | 0 | 20 | 20 | 0 | 20 | 20 | 0 |
| | PH | 10 | 10 | 0 | 10 | 10 | 0 | 20 | 20 | 0 | 20 | 20 | 0 |
| | PHOSPHORUS FIL REACT | 10 | 4 | 4 | 10 | 8 | 2 | . | . | . | . | . | . |
| | PHOSPHORUS TOTAL | 10 | 9 | 1 | 10 | 10 | 0 | . | . | . | . | . | . |
| | SULPHATE | 10 | 10 | 0 | 10 | 10 | 0 | 20 | 20 | 0 | 20 | 20 | 0 |
| | TURBIDITY | 10 | 10 | 0 | 10 | 8 | 2 | 20 | 17 | 3 | 20 | 20 | 0 |
| *TOTAL SCAN CHEMISTRY (LAB) | | 204 | 171 | 19 | 204 | 164 | 21 | 356 | 299 | 39 | 357 | 305 | 29 |
| METALS | SILVER | 10 | 0 | 1 | 10 | 0 | 2 | 20 | 0 | 3 | 20 | 0 | 6 |
| | ALUMINUM | 10 | 10 | 0 | 10 | 10 | 0 | 20 | 20 | 0 | 20 | 20 | 0 |
| | ARSENIC | 10 | 0 | 9 | 10 | 3 | 7 | 20 | 3 | 16 | 20 | 3 | 17 |
| | BARIUM | 10 | 10 | 0 | 10 | 10 | 0 | 20 | 20 | 0 | 20 | 20 | 0 |
| | BORON | 10 | 6 | 4 | 10 | 6 | 4 | 20 | 10 | 10 | 20 | 14 | 6 |
| | BERYLLIUM | 10 | 0 | 6 | 10 | 0 | 4 | 20 | 0 | 12 | 20 | 0 | 10 |

TABLE 4

DRINKING WATER SURVEILLANCE PROGRAM RENFREW

SUMMARY TABLE OF RESULTS (1989)

| SCAN | PARAMETER | SITE | RAW | | | TREATED | | | SITE 1 | | | SITE 2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | TOTAL | POSITIVE | TRACE | TOTAL | POSITIVE | TRACE | TOTAL | POSITIVE | TRACE | TOTAL | POSITIVE | TRACE |
| METALS | CADMIUM | | 10 | 0 | 1 | 10 | 0 | 1 | 20 | 5 | 9 | 20 | 0 | 4 |
| | COBALT | | 10 | 0 | 10 | 10 | 0 | 8 | 20 | 0 | 18 | 20 | 0 | 17 |
| | CHROMIUM | | 10 | 8 | 2 | 10 | 8 | 1 | 20 | 14 | 2 | 20 | 18 | 0 |
| | COPPER | | 10 | 6 | 4 | 10 | 9 | 1 | 20 | 20 | 0 | 20 | 20 | 0 |
| | IRON | | 10 | 9 | 1 | 10 | 0 | 10 | 20 | 9 | 10 | 20 | 11 | 9 |
| | MERCURY | | 10 | 0 | 4 | 10 | 1 | 3 | 10 | 0 | 4 | 10 | 0 | 5 |
| | MANGANESE | | 10 | 10 | 0 | 10 | 10 | 0 | 20 | 19 | 1 | 20 | 20 | 0 |
| | MOLYBDENUM | | 10 | 3 | 7 | 10 | 3 | 7 | 20 | 6 | 14 | 20 | 5 | 15 |
| | NICKEL | | 10 | 0 | 3 | 10 | 1 | 6 | 20 | 0 | 8 | 20 | 9 | 4 |
| | LEAD | | 10 | 8 | 2 | 10 | 7 | 3 | 20 | 18 | 2 | 20 | 20 | 0 |
| | ANTIMONY | | 10 | 9 | 1 | 10 | 9 | 1 | 20 | 18 | 2 | 20 | 18 | 2 |
| | SELENIUM | | 10 | 0 | 3 | 10 | 0 | 4 | 20 | 0 | 7 | 20 | 0 | 8 |
| | STRONTIUM | | 10 | 10 | 0 | 10 | 10 | 0 | 20 | 20 | 0 | 20 | 20 | 0 |
| | TITANIUM | | 10 | 10 | 0 | 10 | 10 | 0 | 20 | 20 | 0 | 20 | 20 | 0 |
| | THALLIUM | | 10 | 0 | 3 | 10 | 0 | 3 | 20 | 0 | 5 | 20 | 0 | 6 |
| | URANIUM | | 10 | 5 | 5 | 10 | 1 | 6 | 20 | 1 | 14 | 20 | 1 | 13 |
| | VANADIUM | | 10 | 6 | 4 | 10 | 2 | 8 | 20 | 3 | 17 | 20 | 0 | 20 |
| | ZINC | | 10 | 9 | 1 | 10 | 10 | 0 | 20 | 20 | 0 | 20 | 20 | 0 |
| *TOTAL SCAN METALS | | | 240 | 119 | 71 | 240 | 110 | 79 | 470 | 226 | 154 | 470 | 239 | 142 |
| *TOTAL GROUP INORGANIC & PHYSICAL | | | 476 | 322 | 90 | 503 | 333 | 100 | 940 | 639 | 193 | 939 | 656 | 171 |
| CHLOROAROMATICS | HEXACHLOROBUTADIENE | | 10 | 0 | 0 | 9 | 0 | 0 | 10 | 0 | 0 | 10 | 0 | 0 |
| | 123 TRICHLOROBENZENE | | 10 | 0 | 0 | 9 | 0 | 0 | 10 | 0 | 0 | 10 | 0 | 0 |

TABLE 4

DRINKING WATER SURVEILLANCE PROGRAM RENFREW

SUMMARY TABLE OF RESULTS (1989)

| | | SITE | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | RAW | | | TREATED | | | SITE 1 | | | SITE 2 | | |
| SCAN | PARAMETER | TOTAL | POSITIVE | TRACE | TOTAL | POSITIVE | TRACE | TOTAL | POSITIVE | TRACE | TOTAL | POSITIVE | TRACE |
| CHLOROAROMATICS | 1234 T-CHLOROBENZENE | 10 | 0 | 0 | 9 | 0 | 0 | 10 | 0 | 0 | 10 | 0 | 0 |
| | 1235 T-CHLOROBENZENE | 10 | 0 | 0 | 9 | 0 | 0 | 10 | 0 | 0 | 10 | 0 | 0 |
| | 124 TRICHLOROBENZENE | 10 | 0 | 0 | 9 | 0 | 0 | 10 | 0 | 0 | 10 | 0 | 0 |
| | 1245 T-CHLOROBENZENE | 10 | 0 | 0 | 9 | 0 | 0 | 10 | 0 | 0 | 10 | 0 | 0 |
| | 135 TRICHLOROBENZENE | 10 | 0 | 0 | 9 | 0 | 0 | 10 | 0 | 0 | 10 | 0 | 0 |
| | HCB | 10 | 0 | 0 | 9 | 0 | 0 | 10 | 0 | 0 | 10 | 0 | 0 |
| | HEXACHLOROETHANE | 10 | 0 | 0 | 9 | 0 | 0 | 10 | 0 | 0 | 10 | 0 | 0 |
| | OCTACHLOROSTYRENE | 10 | 0 | 0 | 9 | 0 | 0 | 10 | 0 | 0 | 10 | 0 | 0 |
| | PENTACHLOROBENZENE | 10 | 0 | 0 | 9 | 0 | 0 | 10 | 0 | 0 | 10 | 0 | 0 |
| | 236 TRICHLOROTOLUENE | 10 | 0 | 0 | 9 | 0 | 0 | 10 | 0 | 0 | 10 | 0 | 0 |
| | 245 TRICHLOROTOLUENE | 10 | 0 | 0 | 9 | 0 | 0 | 10 | 0 | 0 | 10 | 0 | 0 |
| | 26A TRICHLOROTOLUENE | 10 | 0 | 0 | 9 | 0 | 0 | 10 | 0 | 0 | 10 | 0 | 0 |
| *TOTAL SCAN CHLOROAROMATICS | | 140 | 0 | 0 | 126 | 0 | 0 | 140 | 0 | 0 | 140 | 0 | 0 |
| CHLOROPHENOLS | 234 TRICHLOROPHENOL | 2 | 0 | 0 | 2 | 0 | 0 | . | . | . | . | . | . |
| | 2345 T-CHLOROPHENOL | 2 | 0 | 0 | 2 | 0 | 0 | . | . | . | . | . | . |
| | 2356 T-CHLOROPHENOL | 2 | 0 | 0 | 2 | 0 | 0 | . | . | . | . | . | . |
| | 245-TRICHLOROPHENOL | 2 | 0 | 0 | 2 | 0 | 0 | . | . | . | . | . | . |
| | 246-TRICHLOROPHENOL | 2 | 0 | 0 | 2 | 0 | 0 | . | . | . | . | . | . |
| | PENTACHLOROPHENOL | 2 | 0 | 0 | 2 | 0 | 0 | . | . | . | . | . | . |
| *TOTAL SCAN CHLOROPHENOLS | | 12 | 0 | 0 | 12 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

TABLE 4

DRINKING WATER SURVEILLANCE PROGRAM RENFREW

SUMMARY TABLE OF RESULTS (1989)

| SCAN | PARAMETER | SITE | RAW | | | TREATED | | | SITE 1 | | | SITE 2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | TOTAL | POSITIVE | TRACE | TOTAL | POSITIVE | TRACE | TOTAL | POSITIVE | TRACE | TOTAL | POSITIVE | TRACE |
| PAH | PHENANTHRENE | | 10 | 0 | 0 | 10 | 0 | 0 | . | . | . | . | . | . |
| | ANTHRACENE | | 10 | 0 | 0 | 10 | 0 | 0 | . | . | . | . | . | . |
| | FLUORANTHENE | | 10 | 0 | 0 | 10 | 0 | 0 | . | . | . | . | . | . |
| | PYRENE | | 10 | 0 | 0 | 10 | 0 | 0 | . | . | . | . | . | . |
| | BENZO(A)ANTHRACENE | | 10 | 0 | 0 | 10 | 0 | 0 | . | . | . | . | . | . |
| | CHRYSENE | | 10 | 0 | 0 | 10 | 0 | 0 | . | . | . | . | . | . |
| | DIMETH. BENZ(A)ANTHR | | 5 | 0 | 0 | 5 | 0 | 0 | . | . | . | . | . | . |
| | BENZO(E) PYRENE | | 10 | 0 | 0 | 10 | 0 | 0 | . | . | . | . | . | . |
| | BENZO(B) FLUORANTHEN | | 10 | 0 | 0 | 10 | 0 | 0 | . | . | . | . | . | . |
| | PERYLENE | | 10 | 0 | 0 | 10 | 0 | 0 | . | . | . | . | . | . |
| | BENZO(K) FLUORANTHEN | | 10 | 0 | 0 | 10 | 0 | 0 | . | . | . | . | . | . |
| | BENZO(A) PYRENE | | 4 | 0 | 0 | 4 | 0 | 0 | . | . | . | . | . | . |
| | BENZO(G,H,I) PERYLEN | | 10 | 0 | 0 | 10 | 0 | 0 | . | . | . | . | . | . |
| | DIBENZO(A,H) ANTHRAC | | 10 | 0 | 0 | 10 | 0 | 0 | . | . | . | . | . | . |
| | INDENO(1,2,3-C,D) PY | | 10 | 0 | 0 | 10 | 0 | 0 | . | . | . | . | . | . |
| | BENZO(B) CHRYSENE | | 10 | 0 | 0 | 10 | 0 | 0 | . | . | . | . | . | . |
| | CORONENE | | 10 | 0 | 0 | 10 | 0 | 0 | . | . | . | . | . | . |
| *TOTAL SCAN PAH | | | 159 | 0 | 0 | 159 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PESTICIDES & PCB | ALDRIN | | 10 | 0 | 0 | 9 | 0 | 0 | 10 | 0 | 0 | 10 | 0 | 0 |
| | ALPHA BHC | | 10 | 0 | 2 | 9 | 0 | 2 | 10 | 0 | 3 | 10 | 0 | 2 |
| | BETA BHC | | 10 | 0 | 0 | 9 | 0 | 0 | 10 | 0 | 0 | 10 | 0 | 0 |
| | LINDANE | | 10 | 0 | 0 | 9 | 0 | 0 | 10 | 0 | 0 | 10 | 0 | 0 |

TABLE 4

DRINKING WATER SURVEILLANCE PROGRAM RENFREW

SUMMARY TABLE OF RESULTS (1989)

| SCAN | PARAMETER | SITE | RAW | | | TREATED | | | SITE 1 | | | SITE 2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | TOTAL | POSITIVE | TRACE | TOTAL | POSITIVE | TRACE | TOTAL | POSITIVE | TRACE | TOTAL | POSITIVE | TRACE |
| PESTICIDES & PCB | ALPHA CHLORDANE | | 10 | 0 | 0 | 9 | 0 | 0 | 10 | 0 | 0 | 10 | 0 | 0 |
| | GAMMA CHLORDANE | | 10 | 0 | 0 | 9 | 0 | 0 | 10 | 0 | 0 | 10 | 0 | 0 |
| | DIELDRIN | | 10 | 0 | 0 | 9 | 0 | 0 | 10 | 0 | 0 | 10 | 0 | 0 |
| | METHOXYCHLOR | | 10 | 0 | 0 | 9 | 0 | 0 | 10 | 0 | 0 | 10 | 0 | 0 |
| | ENDOSULFAN I | | 10 | 0 | 0 | 9 | 0 | 0 | 10 | 0 | 0 | 10 | 0 | 0 |
| | ENDOSULFAN II | | 10 | 0 | 0 | 9 | 0 | 0 | 10 | 0 | 0 | 10 | 0 | 0 |
| | ENDRIN | | 10 | 0 | 0 | 9 | 0 | 0 | 10 | 0 | 0 | 10 | 0 | 0 |
| | ENDOSULFAN SULPHATE | | 10 | 0 | 0 | 9 | 0 | 0 | 10 | 0 | 0 | 10 | 0 | 0 |
| | HEPTACHLOR EPOXIDE | | 10 | 0 | 0 | 9 | 0 | 0 | 10 | 0 | 0 | 10 | 0 | 0 |
| | HEPTACHLOR | | 10 | 0 | 0 | 9 | 0 | 0 | 10 | 0 | 0 | 10 | 0 | 0 |
| | MIREX | | 10 | 0 | 0 | 9 | 0 | 0 | 10 | 0 | 0 | 10 | 0 | 0 |
| | OXYCHLORDANE | | 10 | 0 | 0 | 9 | 0 | 0 | 10 | 0 | 0 | 10 | 0 | 0 |
| | OPDDT | | 10 | 0 | 0 | 9 | 0 | 0 | 10 | 0 | 0 | 10 | 0 | 0 |
| | PCB | | 10 | 0 | 0 | 9 | 0 | 0 | 10 | 0 | 0 | 10 | 0 | 0 |
| | DDD | | 10 | 0 | 0 | 9 | 0 | 0 | 10 | 0 | 0 | 10 | 0 | 0 |
| | PPDDE | | 10 | 0 | 0 | 9 | 0 | 0 | 10 | 0 | 0 | 10 | 0 | 0 |
| | PPDDT | | 10 | 0 | 0 | 9 | 0 | 0 | 10 | 0 | 0 | 10 | 0 | 0 |
| | AMETRINE | | 9 | 0 | 0 | 9 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 |
| | ATRAZINE | | 9 | 0 | 0 | 9 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 |
| | ATRATONE | | 9 | 0 | 0 | 9 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 |
| | CYANAZINE | | 9 | 0 | 0 | 9 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 |
| | D-ETHYL ATRAZINE | | 9 | 0 | 0 | 9 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 |
| | DES ETHYL SIMAZINE | | 9 | 0 | 0 | 9 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 |
| | PROMETONE | | 9 | 0 | 0 | 9 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 |
| | PROPAZINE | | 9 | 0 | 0 | 9 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 |

TABLE 4

DRINKING WATER SURVEILLANCE PROGRAM RENFREW

SUMMARY TABLE OF RESULTS (1989)

| | | SITE | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | RAW | | | TREATED | | | SITE 1 | | | SITE 2 | | |
| SCAN | PARAMETER | TOTAL | POSITIVE | TRACE | TOTAL | POSITIVE | TRACE | TOTAL | POSITIVE | TRACE | TOTAL | POSITIVE | TRACE |
| PESTICIDES & PCB | PROMETRYNE | 9 | 0 | 0 | 9 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 |
| | METRIBUZIN (SENCOR)* | 9 | 0 | 0 | 9 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 |
| | SIMAZINE | 9 | 0 | 0 | 9 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 |
| | ALACHLOR | 9 | 0 | 0 | 9 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 |
| | METOLACHLOR | 9 | 0 | 0 | 9 | 0 | 0 | 5 | 0 | 0 | 5 | 0 | 0 |
| *TOTAL SCAN PESTICIDES & PCB | | 327 | 0 | 2 | 306 | 0 | 2 | 275 | 0 | 3 | 275 | 0 | 2 |
| PHENOLICS | PHENOLICS | 10 | 9 | 1 | 10 | 9 | 1 | . | . | . | . | . | . |
| *TOTAL SCAN PHENOLICS | | 10 | 9 | 1 | 10 | 9 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| SPECIFIC PESTICIDES | TOXAPHENE | 10 | 0 | 0 | 9 | 0 | 0 | 10 | 0 | 0 | 10 | 0 | 0 |
| | 2,4,5-T | 2 | 0 | 0 | 2 | 0 | 0 | . | . | . | . | . | . |
| | 2,4-D | 2 | 0 | 0 | 2 | 0 | 0 | . | . | . | . | . | . |
| | 2,4-DB | 2 | 0 | 0 | 2 | 0 | 0 | . | . | . | . | . | . |
| | 2,4 D PROPIONIC ACID | 1 | 0 | 0 | 1 | 0 | 0 | . | . | . | . | . | . |
| | DICAMBA | 2 | 0 | 0 | 2 | 0 | 0 | . | . | . | . | . | . |
| | PICHLORAM | 0 | 0 | 0 | 0 | 0 | 0 | . | . | . | . | . | . |
| | SILVEX | 2 | 0 | 0 | 2 | 0 | 0 | . | . | . | . | . | . |
| | DIAZINON | 2 | 0 | 0 | 2 | 0 | 0 | . | . | . | . | . | . |
| | DICHLOROVOS | 2 | 0 | 0 | 2 | 0 | 0 | . | . | . | . | . | . |
| | CHLORPYRIFOS | 2 | 0 | 0 | 2 | 0 | 0 | . | . | . | . | . | . |

TABLE 4

DRINKING WATER SURVEILLANCE PROGRAM RENFREW

SUMMARY TABLE OF RESULTS (1989)

| | | SITE | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | RAW | | | TREATED | | | SITE 1 | | | SITE 2 | | |
| SCAN | PARAMETER | TOTAL | POSITIVE | TRACE | TOTAL | POSITIVE | TRACE | TOTAL | POSITIVE | TRACE | TOTAL | POSITIVE | TRACE |
| SPECIFIC PESTICIDES | ETHION | 2 | 0 | 0 | 2 | 0 | 0 | . | . | . | . | . | . |
| | AZINPHOS-METHYL | 0 | 0 | 0 | 0 | 0 | 0 | . | . | . | . | . | . |
| | MALATHION | 2 | 0 | 0 | 2 | 0 | 0 | . | . | . | . | . | . |
| | MEVINPHOS | 2 | 0 | 0 | 2 | 0 | 0 | . | . | . | . | . | . |
| | METHYL PARATHION | 2 | 0 | 0 | 2 | 0 | 0 | . | . | . | . | . | . |
| | METHYLTRITHION | 2 | 0 | 0 | 2 | 0 | 0 | . | . | . | . | . | . |
| | PARATHION | 2 | 0 | 0 | 2 | 0 | 0 | . | . | . | . | . | . |
| | PHORATE | 2 | 0 | 0 | 2 | 0 | 0 | . | . | . | . | . | . |
| | RELDAN | 2 | 0 | 0 | 2 | 0 | 0 | . | . | . | . | . | . |
| | [illegible] | 2 | 0 | 0 | 2 | 0 | 0 | . | . | . | . | . | . |
| | AMINOCARB | 0 | 0 | 0 | 0 | 0 | 0 | | . | . | . | . | . |
| | BENOMYL | 1 | 0 | 0 | 1 | 0 | 0 | . | . | . | . | . | . |
| | BUX | 0 | 0 | 0 | 0 | 0 | 0 | . | . | . | . | . | . |
| | CARBOFURAN | 2 | 0 | 0 | 2 | 0 | 0 | . | . | . | . | . | . |
| | CICP | 2 | 0 | 0 | 2 | 0 | 0 | . | . | . | . | . | . |
| | DIALLATE | 2 | 0 | 0 | 2 | 0 | 0 | . | . | . | . | . | . |
| | EPTAM | 2 | 0 | 0 | 2 | 0 | 0 | . | . | . | . | . | . |
| | IPC | 2 | 0 | 0 | 2 | 0 | 0 | . | . | . | . | . | . |
| | PROPOXUR | 2 | 0 | 0 | 2 | 0 | 0 | . | . | . | . | . | . |
| | CARBARYL | 2 | 0 | 0 | 2 | 0 | 0 | . | . | . | . | . | . |
| | BUTYLATE | 2 | 0 | 0 | 2 | 0 | 0 | . | . | . | . | . | . |
| *TOTAL SCAN SPECIFIC PESTICIDES | | 62 | 0 | 0 | 61 | 0 | 0 | 10 | 0 | 0 | 10 | 0 | 0 |
| VOLATILES | BENZENE | 10 | 0 | 0 | 9 | 0 | 1 | 10 | 0 | 2 | 9 | 0 | 0 |

TABLE 4

DRINKING WATER SURVEILLANCE PROGRAM RENFREW

SUMMARY TABLE OF RESULTS (1989)

| SCAN | PARAMETER | SITE | RAW | | | TREATED | | | SITE 1 | | | SITE 2 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | TOTAL | POSITIVE | TRACE | TOTAL | POSITIVE | TRACE | TOTAL | POSITIVE | TRACE | TOTAL | POSITIVE | TRACE |
| VOLATILES | TOLUENE | | 10 | 0 | 0 | 9 | 0 | 5 | 10 | 0 | 5 | 9 | 0 | 3 |
| | ETHYLBENZENE | | 10 | 0 | 1 | 9 | 0 | 5 | 10 | 0 | 3 | 9 | 0 | 1 |
| | P-XYLENE | | 10 | 0 | 0 | 9 | 0 | 0 | 10 | 0 | 0 | 9 | 0 | 0 |
| | M-XYLENE | | 10 | 0 | 0 | 9 | 0 | 1 | 10 | 0 | 1 | 9 | 0 | 0 |
| | O-XYLENE | | 10 | 0 | 0 | 9 | 0 | 2 | 10 | 0 | 2 | 9 | 0 | 0 |
| | STYRENE | | 10 | 0 | 4 | 9 | 0 | 8 | 10 | 0 | 8 | 9 | 0 | 9 |
| | 1,1 DICHLOROETHYLENE | | 10 | 0 | 0 | 9 | 0 | 0 | 10 | 0 | 0 | 9 | 0 | 0 |
| | METHYLENE CHLORIDE | | 10 | 0 | 0 | 9 | 0 | 0 | 10 | 0 | 0 | 9 | 0 | 0 |
| | T1,2DICHLOROETHYLENE | | 10 | 0 | 0 | 9 | 0 | 0 | 10 | 0 | 0 | 9 | 0 | 0 |
| | 1,1 DICHLOROETHANE | | 10 | 0 | 0 | 9 | 0 | 0 | 10 | 0 | 0 | 9 | 0 | 0 |
| | CHLOROFORM | | 10 | 2 | 8 | 9 | 9 | 0 | 10 | 10 | 0 | 9 | 9 | 0 |
| | 111, TRICHLOROETHANE | | 10 | 0 | 2 | 9 | 0 | 0 | 10 | 0 | 0 | 9 | 0 | 0 |
| | 1,2 DICHLOROETHANE | | 10 | 0 | 0 | 9 | 0 | 0 | 10 | 0 | 0 | 9 | 0 | 0 |
| | CARBON TETRACHLORIDE | | 10 | 0 | 0 | 9 | 0 | 0 | 10 | 0 | 0 | 9 | 0 | 0 |
| | 1,2 DICHLOROPROPANE | | 10 | 0 | 0 | 9 | 0 | 0 | 10 | 0 | 0 | 9 | 0 | 0 |
| | TRICHLOROETHYLENE | | 10 | 0 | 0 | 9 | 0 | 0 | 10 | 0 | 0 | 9 | 0 | 0 |
| | DICHLOROBROMOMETHANE | | 10 | 2 | 2 | 9 | 9 | 0 | 10 | 10 | 0 | 9 | 9 | 0 |
| | 112 TRICHLOROETHANE | | 10 | 0 | 0 | 9 | 0 | 0 | 10 | 0 | 0 | 9 | 0 | 0 |
| | CHLORODIBROMOMETHANE | | 10 | 0 | 2 | 9 | 0 | 6 | 10 | 0 | 7 | 9 | 0 | 7 |
| | T-CHLOROETHYLENE | | 10 | 0 | 0 | 9 | 0 | 0 | 10 | 0 | 0 | 9 | 0 | 0 |
| | BROMOFORM | | 10 | 0 | 0 | 9 | 0 | 0 | 10 | 0 | 0 | 9 | 0 | 0 |
| | 1122 T-CHLOROETHANE | | 10 | 0 | 0 | 9 | 0 | 0 | 10 | 0 | 0 | 9 | 0 | 0 |
| | CHLOROBENZENE | | 10 | 0 | 0 | 9 | 0 | 0 | 10 | 0 | 0 | 9 | 0 | 0 |
| | 1,4 DICHLOROBENZENE | | 10 | 0 | 0 | 9 | 0 | 2 | 10 | 0 | 2 | 9 | 0 | 1 |
| | 1,3 DICHLOROBENZENE | | 10 | 0 | 0 | 9 | 0 | 0 | 10 | 0 | 0 | 9 | 0 | 0 |

TABLE 4

DRINKING WATER SURVEILLANCE PROGRAM RENFREW

SUMMARY TABLE OF RESULTS (1989)

| SCAN | PARAMETER | SITE RAW TOTAL | RAW POSITIVE | RAW TRACE | TREATED TOTAL | TREATED POSITIVE | TREATED TRACE | SITE 1 TOTAL | SITE 1 POSITIVE | SITE 1 TRACE | SITE 2 TOTAL | SITE 2 POSITIVE | SITE 2 TRACE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| VOLATILES | 1,2 DICHLOROBENZENE | 10 | 0 | 0 | 9 | 0 | 1 | 10 | 0 | 0 | 9 | 0 | 0 |
| | ETHLYENE DIBROMIDE [4] | 10 | 0 | 0 | 9 | 0 | 0 | 10 | 0 | 0 | 9 | 0 | 0 |
| | TOTL TRIHALOMETHANES | 10 | 2 | 5 | 9 | 9 | 0 | 10 | 10 | 0 | 9 | 9 | 0 |
| *TOTAL SCAN VOLATILES | | 290 | 6 | 24 | 261 | 27 | 31 | 290 | 30 | 30 | 261 | 27 | 21 |
| *TOTAL GROUP ORGANIC | | 1000 | 15 | 27 | 935 | 36 | 34 | 7 | 30 | 33 | 686 | 27 | 23 |
| TOTAL | | 1506 | 363 | 117 | 1468 | 371 | 134 | 1685 | 674 | 226 | 1655 | 694 | 194 |

## KEY TO TABLE 5 and 6

A ONTARIO DRINKING WATER OBJECTIVES (ODWO)
1. Maximum Acceptable Concentration (MAC)
1+. MAC for Total Trihalomethanes
1*. MAC for Bacteriological Analyses
Poor water quality is indicated when :
- total coliform counts > 0 < 5
- P/A Bottle Test is present after 48 hours
- Aeromonas organisms are detected in more than 25% of samples in a single submission or in successive submissions from the same sampling site
- Pseudomonas Aeruginosa, Staphylococcus Aureus and membe. s of the Fecal Streptococcus group should not be detected in any sample
- Standard Plate Count should not exceed 500 organisms per ml at 35 $^{0}$C within 48 hours

2. Interim Maximum Acceptable Concentration (IMAC)
3. Maximum Desirable Concentration (MDC)
4. Aesthetic or Recommended Operational Guideline
- hardness levels between 80 and 100 mg/L as calcium carbonate are considered to provide an acceptable balance between corrosion and incrustation, water supplies with a hardness >200 mg/L are considered poor and those in excess of 500 mg/L are unacceptable.

B HEALTH & WELFARE CANADA (H&W)
1. Maximum Acceptable Concentration (MAC)
2. Proposed MAC
3. Interim MAC
4. Aesthetic Objective (AO) (for xylenes, the AO is a total)

C WORLD HEALTH ORGANIZATION (WHO)
1. Guideline Value (GV)
2. Tentative GV
3. Aesthetic GV

D US ENVIRONMENTAL PROTECTION AGENCY (EPA)
1. Maximum Contaminant Level (MCL)
2. Suggested No-Adverse Effect Level (SNAEL)
3. Lifetime Health Advisory
4. EPA Ambient Water Quality Criteria

F EUROPEAN ECONOMIC COMMUNITY (EEC)
1. Health Related Guideline Level
2. Aesthetic Guideline Level
3. Maximum Admissable Concentration (MADC)

G CALIFORNIA STATE DEPARTMENT OF HEALTH-GUIDELINE VALUE

H USSR MAXIMUM PERMISSIBLE CONCENTRATION

I NEW YORK STATE AMBIENT WATER GUIDELINE

N/A NONE AVAILABLE

## INTERPRETATION OF DATA

The interpretation of analytical results that are obtained from measurements near the limit of detection of the measurement process is subject to greater uncertainty than those at higher concentrations. The principle areas of concern relate to whether the substance has actually been detected, whether it has been properly identified, and whether it is an artifact of the measurement process. In other words, false positives can be caused by the instrumentation or the test procedures used, when in fact these compounds are not present in the sample.

There are several methods to treat data from such measurements:
1. Exclude the low-level data because of this uncertainty factor. However, studies of long-term environmental trends and modelling may be adversely affected by exclusion of such data.
2. Qualify these data so the user is aware of the greater uncertainty associated with their use.

For the Drinking Water Surveillance Program, measurements near the limit of detection of the measurement process are reported qualified by the code "<T". Results quantified by "W" indicate a zero measurement. These results are reported for purposes of modelling and long-term trend analysis and no significance should be attributed to a single determination of a substance below "T" (a single determination may well be a false positive). Repeat analysis or additional data are needed before it can be stated with certainty that the substance in question was truly present. On the other hand, it is less likely that repeated detection of a substance at or near the limit of detection at a specific location is solely due to an artifact in the measurement system, and more likely represents a true positive. However the average of such data is still only an estimate of the amount of substance present subject to the possible biases of the method used.

## LABORATORY RESULTS, REMARK DESCRIPTIONS

| | |
|---|---|
| . | No Sample Taken |
| BDL | Below Minimum Measurable Amount |
| <T | Greater Than Detection Limit But Not Confident (SEE INTERPRETATION OF RESULTS ABOVE) |
| > | Results Are Greater Than The Upper Limit |
| <=> | Approximate Result |
| !CS | No Data: Contamination Suspected |
| !IL | No Data: Sample Incorrectly Labelled |
| !IS | No Data: Insufficient Sample |
| !IV | No Data: Inverted Septum |
| !LA | No Data: Laboratory Accident |
| !LD | No Data: Test Queued After Sample Discarded |

| | |
|---|---|
| !NA | No Data: No Authorization To Perform Reanalysis |
| !NP | No Data: No Procedure |
| !NR | No Data: Sample Not Received |
| !OP | No Data: Obscured Plate |
| !QU | No Data: Quality Control Unacceptable |
| !RE | No Data: Received Empty |
| !RO | No Data: See Attached Report (no numeric results) |
| !SM | No Data: Sample Missing |
| !SS | No Data: Send Separate Sample Properly Preserved |
| !UI | No Data: Indeterminant Interference |
| !TX | No Data: Time Expired |
| A3C | Approximate, Total Count Exceeded 300 Colonies |
| APL | Additional Peak, Large, Not Priority Pollutant |
| APS | Additional Peak, Less Than, Not Priority Pollutant |
| CIC | Possible Contamination, Improper Cap |
| CRO | Calculated Result Only |
| PPS | Test Performed On Preserved Sample |
| RMP | P and M-Xylene Not Separated |
| RRV | Rerun Verification |
| RVU | Reported Value Unusual |
| SPS | Several Peaks, Small, Not Priority Pollutant |
| UAL | Unreliable: Sample Age Exceeds Normal Limit |
| UCR | Unreliable: Could Not Confirm By Reanalysis |
| UCS | Unreliable: Contamination Suspected |
| USD | Unreliable: Sample Decomposition Noted |
| UIN | Unreliable: Indeterminant Interference |
| XP | Positive After X Number of Hours |
| T# (T06) | Result Taken After # Hours |

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM RENFREW WTP 1989

| | WATER TREATMENT PLANT | | DISTRIBUTION SYSTEM | | | |
|---|---|---|---|---|---|---|
| | RAW | TREATED | SITE 1 | | SITE 2 | |
| | | | STANDING | FREE FLOW | STANDING | FREE FLOW |
| **BACTERIOLOGICAL** | | | | | | |
| FECAL COLIFORM MF (CT/100ML ) | | | DET'N LIMIT = 0 | | GUIDELINE = 0 (A1) | |
| MAR | 10 | . | . | . | . | . |
| APR | 2 T48 | . | . | . | . | . |
| MAY | 103 | . | . | . | . | . |
| JUN | 40 | . | . | . | . | . |
| JUL | 320 | . | . | . | . | . |
| AUG | BDL | . | . | . | . | . |
| SEP | 62 | . | . | . | . | . |
| OCT | 16 | . | . | . | . | . |
| NOV | 58 | . | . | . | . | . |
| DEC | 18 | . | . | . | . | . |
| STANDRD PLATE CNT MF ( ) | | | DET'N LIMIT = 0 | | GUIDELINE = 500/ML (A1) | |
| MAR | . | 1 <=> | . | 1 <=> | . | 0 <=> |
| APR | . | 0 <=> | . | 3 <=> | . | 19 T48 |
| MAY | . | 4 <=> | . | 18 | . | 11 |
| JUN | . | 20 | . | 62 | . | 188 |
| JUL | . | 3 <=> | . | 19 | . | 1020 |
| AUG | . | 3 <=> | . | 2 <=> | . | 620 |
| SEP | . | 0 <=> | . | 28 | . | 220 |
| OCT | . | 1 <=> | . | 4 <=> | . | 2 <=> |
| NOV | . | 14 | . | 67 | . | 8 <=> |
| DEC | . | 0 <=> | . | 0 <=> | . | 1 <=> |
| TOTAL COLIFORM MF (CT/100ML ) | | | DET'N LIMIT = 0 | | GUIDELINE = 5/100ML(A1) | |
| MAR | 68 A3C | 0 | . | 0 | . | 0 |
| APR | 300 T48 | 0 T48 | . | 0 T48 | . | 0 T48 |
| MAY | 3000 > | 0 | . | 0 | . | 0 |
| JUN | 340 A3C | 0 | . | 0 | . | 0 |
| JUL | 700 <=> | 0 | . | 0 | . | 0 |
| AUG | BDL | 0 | . | 0 | . | 0 |
| SEP | 280 A3C | 0 | . | 0 | . | 0 |
| OCT | 240 A3C | 0 | . | 0 | . | 0 |
| NOV | 1700 | 0 | . | 0 | . | 0 |
| DEC | 540 A3C | 0 | . | 0 | . | 0 |
| T COLIFORM BCKGRD MF (CT/100ML ) | | | DET'N LIMIT = 0 | | GUIDELINE = N/A | |
| MAR | 760 A3C | 0 | . | 0 | . | 0 |
| APR | 1040 T48 | 0 T48 | . | 0 T48 | . | 0 T48 |
| MAY | 3000 > | 0 | . | 0 | . | 4 |
| JUN | 24000 > | 0 | . | 0 | . | 8 |
| JUL | 40000 > | 0 | . | 0 | . | 300 |
| AUG | BDL | 0 | . | 0 | . | 20 |
| SEP | 38000 A3C | 0 | . | 0 | . | 11 |
| OCT | 26000 A3C | 0 | . | 0 | . | 0 |
| NOV | 6700 | 0 | . | 0 | . | 0 |

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM RENFREW WTP 1989

| | WATER TREATMENT PLANT | | DISTRIBUTION SYSTEM | | | |
|---|---|---|---|---|---|---|
| | RAW | TREATED | SITE 1 | | SITE 2 | |
| | | | STANDING | FREE FLOW | STANDING | FREE FLOW |
| DEC | 5800 A3C | 0 | . | 0 | . | 0 |

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM REMFREW WTP 1989

| | WATER TREATMENT PLANT | | DISTRIBUTION SYSTEM | | | |
|---|---|---|---|---|---|---|
| | RAW | TREATED | SITE 1 | | SITE 2 | |
| | | | STANDING | FREE FLOW | STANDING | FREE FLOW |
| CHEMISTRY (FLD) | | | | | | |
| FLD CHLORINE (COMB) ( ) | | | DET'N LIMIT = N/A | | GUIDELINE = N/A | |
| MAR | . | .100 | .200 | .200 | . | . |
| APR | . | .200 | . | .100 | . | . |
| MAY | . | .100 | . | . | . | . |
| JUN | . | .500 | .200 | .200 | .300 | .100 |
| JUL | . | .100 | .200 | .200 | .200 | .200 |
| AUG | . | .400 | .200 | .200 | .200 | .200 |
| SEP | . | .300 | .030 | .200 | .100 | .100 |
| OCT | . | .300 | .220 | .200 | .300 | .100 |
| NOV | . | .350 | .180 | .150 | .200 | .200 |
| DEC | .200 | .100 | .200 | .100 | .100 | .100 |
| FLD CHLORINE FREE ( ) | | | DET'N LIMIT = N/A | | GUIDELINE = N/A | |
| MAR | . | .800 | .500 | .500 | .100 | .100 |
| APR | . | .500 | .100 | .300 | .100 | .100 |
| MAY | . | .500 | . | .100 | . | .100 |
| JUN | . | .200 | .100 | .100 | .200 | .100 |
| JUL | . | .300 | .200 | .100 | .100 | .200 |
| AUG | . | .200 | .100 | .100 | .100 | .200 |
| SEP | . | .300 | .020 | .100 | .080 | .100 |
| OCT | . | .300 | .100 | .100 | .100 | .100 |
| NOV | . | .250 | .150 | .500 | .100 | .100 |
| DEC | .100 | .500 | .450 | .100 | .100 | .100 |
| FLD CHLORINE (TOTAL) ( ) | | | DET'N LIMIT = N/A | | GUIDELINE = N/A | |
| MAR | . | .900 | .700 | .700 | .100 | .100 |
| APR | . | .700 | .100 | .400 | .100 | .100 |
| MAY | . | .600 | . | .100 | . | .100 |
| JUN | . | .700 | .300 | .300 | .500 | .200 |
| JUL | . | .400 | .400 | .300 | .300 | .400 |
| AUG | . | .600 | .300 | .300 | .300 | .400 |
| SEP | . | .600 | .050 | .300 | .180 | .200 |
| OCT | . | .600 | .450 | .300 | .400 | .220 |
| NOV | . | .600 | .350 | .650 | .300 | .300 |
| DEC | .200 | .600 | .650 | .200 | .200 | .200 |
| FLD PH (DIMNSLESS ) | | | DET'N LIMIT = N/A | | GUIDELINE = 6.5-8.5(A4) | |
| MAR | 7.400 | 6.800 | 6.800 | 6.800 | 6.800 | 6.800 |
| APR | 7.800 | 7.100 | 7.000 | 7.100 | 6.900 | 7.000 |
| MAY | 7.800 | 7.300 | 7.300 | 7.350 | 7.300 | 7.280 |
| JUN | 7.700 | 7.100 | 7.300 | 7.200 | 7.200 | 7.100 |
| JUL | . | . | . | 7.100 | 7.400 | 7.100 |
| AUG | 7.600 | 7.000 | 7.500 | 7.300 | 7.600 | 7.200 |
| SEP | 7.800 | 7.100 | 7.200 | 7.140 | 7.410 | 7.270 |
| OCT | 7.900 | 7.130 | 7.300 | 7.180 | 7.440 | 7.240 |
| NOV | 7.900 | 7.200 | 7.350 | 7.170 | 7.500 | 7.500 |

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM RENFREW WTP 1989

| | WATER TREATMENT PLANT | | DISTRIBUTION SYSTEM | | | |
|---|---|---|---|---|---|---|
| | RAW | TREATED | SITE 1 | | SITE 2 | |
| | | | STANDING | FREE FLOW | STANDING | FREE FLOW |
| DEC | 7.700 | 7.000 | 7.300 | 7.600 | 7.200 | 7.500 |
| FLD TEMPERATURE (DEG.C ) | | | DET'N LIMIT = N/A | | GUIDELINE = 15 (A1) | |
| MAR | 3.500 | 3.000 | 15.000 | 12.000 | 13.000 | 5.000 |
| APR | 5.000 | 6.000 | 20.000 | 4.000 | 20.000 | 4.000 |
| MAY | 11.000 | 12.000 | 18.000 | 14.000 | 17.000 | 13.000 |
| JUN | 19.000 | 19.000 | 19.000 | 17.000 | 19.000 | 14.500 |
| JUL | 24.000 | 26.000 | 24.000 | 25.000 | 28.000 | 22.000 |
| AUG | 25.000 | 25.000 | 25.000 | 22.000 | 28.000 | 23.000 |
| SEP | 19.000 | 19.000 | 20.200 | 19.100 | 21.000 | 19.300 |
| OCT | 10.000 | 10.000 | 17.400 | 18.800 | 19.100 | 15.300 |
| NOV | 7.000 | 7.000 | 15.000 | 9.500 | 17.000 | 11.000 |
| DEC | 1.000 | 2.000 | 19.000 | 13.000 | 20.000 | 9.000 |
| FLD TURBIDITY (FTU ) | | | DET'N LIMIT = N/A | | GUIDELINE = 1.0 (A1) | |
| MAR | 1.000 | .400 | .400 | .300 | .900 | .300 |
| APR | 2.500 | .200 | .300 | .200 | .500 | .200 |
| MAY | 3.500 | .400 | .200 | .300 | .300 | .400 |
| JUN | 4.000 | .400 | .600 | .500 | .800 | .600 |
| JUL | 8.000 | .300 | .400 | .400 | .600 | .500 |
| AUG | 2.100 | .200 | .200 | .100 | .100 | .100 |
| SEP | 2.500 | .200 | .400 | .250 | .380 | .270 |
| OCT | 6.000 | .260 | .290 | .260 | .350 | .230 |
| NOV | .500 | .240 | .300 | .280 | .400 | .300 |
| DEC | 2.000 | .200 | .200 | .200 | .200 | .200 |

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM RENFREW WTP 1989

| | WATER TREATMENT PLANT | | DISTRIBUTION SYSTEM | | | |
|---|---|---|---|---|---|---|
| | RAW | TREATED | SITE 1 | | SITE 2 | |
| | | | STANDING | FREE FLOW | STANDING | FREE FLOW |
| | CHEMISTRY (LAB) | | | | | |
| ALKALINITY (MG/L ) | | | DET'N LIMIT = .200 | | GUIDELINE = 30-500 (A4) | |
| MAR | 46.300 | 31.700 | 31.600 | 31.400 | 37.000 | 35.400 |
| APR | 65.900 | 52.900 | 54.100 | 52.800 | 55.400 | 54.200 |
| MAY | 114.300 | 97.200 | 98.400 | 96.400 | 86.600 | 87.300 |
| JUN | 104.100 | 87.000 | 84.400 | 85.100 | 79.300 | 80.900 |
| JUL | 50.000 | 45.000 | 45.200 | 45.000 | 51.600 | 48.400 |
| AUG | 47.100 | 48.000 | 48.600 | 47.800 | 52.600 | 52.500 |
| SEP | 58.400 | 45.300 | 45.200 | 46.200 | 47.600 | 47.200 |
| OCT | 62.500 | 44.900 | 44.600 | 43.300 | 48.100 | 47.700 |
| NOV | 116.100 | 92.900 | 93.400 | 93.200 | 90.700 | 91.000 |
| DEC | 95.600 | 77.300 | 78.100 | 78.000 | 87.500 | 85.400 |
| CALCIUM (MG/L ) | | | DET'N LIMIT = .100 | | GUIDELINE = 100 (F2) | |
| MAR | 15.800 | 20.000 | 19.800 | 20.000 | 22.000 | 21.800 |
| APR | 22.000 | 27.800 | 28.200 | 28.200 | 28.000 | 28.400 |
| MAY | 37.000 | 41.200 | 40.800 | 39.800 | 36.800 | 37.200 |
| JUN | 33.600 | 38.600 | 38.400 | 38.200 | 36.600 | 35.800 |
| JUL | 23.800 | 24.400 | 23.200 | 24.000 | 26.200 | 26.000 |
| AUG | 24.000 | 23.200 | 22.600 | 22.400 | 25.000 | 27.000 |
| SEP | 20.000 | 25.200 | 25.400 | 25.200 | 26.400 | 26.400 |
| OCT | 20.800 | 25.000 | 25.600 | 25.600 | 27.400 | 27.800 |
| NOV | 38.000 | 41.200 | 41.400 | 42.000 | 41.800 | 42.200 |
| DEC | 33.600 | 38.000 | 36.000 | 37.800 | 40.800 | 40.600 |
| CHLORIDE (MG/L ) | | | DET'N LIMIT = .200 | | GUIDELINE = 250 (A3) | |
| MAR | 2.900 | 4.500 | 4.600 | 4.600 | 5.000 | 4.800 |
| APR | 4.600 | 6.100 | 6.300 | 6.000 | 6.500 | 6.600 |
| MAY | 12.600 | 12.200 | 12.000 | 11.700 | 9.700 | 9.600 |
| JUN | 7.400 | 9.500 | 9.700 | 9.700 | 10.000 | 10.200 |
| JUL | 7.500 | 7.700 | 7.400 | 7.400 | 5.900 | 5.800 |
| AUG | 5.700 | 5.700 | 5.800 | 5.700 | 6.000 | 5.900 |
| SEP | 4.400 | 6.200 | 6.200 | 5.900 | 6.200 | 6.300 |
| OCT | 5.500 | 7.400 | 7.600 | 7.500 | 7.600 | 7.700 |
| NOV | 13.400 | 15.200 | 15.600 | 15.800 | 17.700 | 17.600 |
| DEC | 6.600 | 8.500 | 11.100 | 8.600 | 9.700 | 9.400 |
| COLOUR (HZU ) | | | DET'N LIMIT = .5 | | GUIDELINE = 5.0 (A3) | |
| MAR | 13.500 | 2.000 <T | 3.000 | 2.000 <T | 5.000 | 3.000 |
| APR | 16.500 | 2.500 | 4.500 | 3.000 | 4.000 | 4.000 |
| MAY | 22.500 | 5.500 | 6.000 | 6.000 | 5.000 | 5.000 |
| JUN | 29.500 | 7.000 | 9.000 | 8.000 | 7.500 | 7.500 |
| JUL | 8.500 | 4.000 | 5.000 | 4.500 | 4.500 | 4.500 |
| AUG | 2.500 | 2.500 | 4.000 | 3.000 | 4.000 | 3.500 |
| SEP | 13.000 | 2.000 <T | 2.500 | 2.500 | 3.000 | 2.500 |
| OCT | 15.000 | 2.000 <T | 4.000 | 2.500 | 3.000 | 3.500 |
| NOV | 18.000 | 3.500 | 4.500 | 4.000 | 4.500 | 4.500 |

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM RENFREW WTP 1989

| | WATER TREATMENT PLANT | | DISTRIBUTION SYSTEM | | | |
|---|---|---|---|---|---|---|
| | RAW | TREATED | SITE 1 | | SITE 2 | |
| | | | STANDING | FREE FLOW | STANDING | FREE FLOW |
| DEC | 15.500 | 3.000 | 5.000 | 3.000 | 5.000 | 4.500 |
| CONDUCTIVITY (UMHO/CM ) | | | DET'N LIMIT = 1 | | GUIDELINE = 400 (F2) | |
| MAR | 129 | 166 | 165 | 166 | 175 | 173 |
| APR | 173 | 212 | 214 | 212 | 218 | 216 |
| MAY | 293 | 307 | 310 | 307 | 282 | 282 |
| JUN | 242 | 273 | 271 | 272 | 261 | 264 |
| JUL | 188 | 194 | 193 | 194 | 197 | 192 |
| AUG | 196 | 195 | 197 | 195 | 201 | 201 |
| SEP | 153 | 194 | 194 | 193 | 198 | 197 |
| OCT | 168 | 208 | 210 | 208 | 215 | 214 |
| NOV | 295 | 325 | 327 | 327 | 329 | 329 |
| DEC | 233 | 271 | 285 | 272 | 292 | 288 |
| FLUORIDE (MG/L ) | | | DET'N LIMIT = .01 | | GUIDELINE = 2.400 (A1) | |
| MAR | .260 | 1.040 | 1.120 | 1.140 | 1.120 | 1.080 |
| APR | .080 | 1.140 | 1.060 | 1.080 | 1.120 | 1.040 |
| MAY | .100 | 1.180 | 1.180 | 1.160 | 1.160 | 1.160 |
| JUN | .080 | 1.120 | 1.000 | 1.000 | 1.040 | 1.020 |
| JUL | .840 | 1.120 | 1.000 | 1.080 | 1.040 | 1.020 |
| AUG | .960 | 1.000 | 1.000 | 1.020 | 1.020 | 1.000 |
| SEP | .060 | 1.100 | 1.080 | .800 | 1.000 | 1.020 |
| OCT | .080 | 1.260 | 1.240 | 1.240 | 1.020 | 1.060 |
| NOV | .100 | 1.240 | 1.260 | 1.220 | 1.160 | 1.160 |
| DEC | .080 | 1.020 | 1.180 | .980 | 1.060 | .980 |
| HARDNESS (MG/L ) | | | DET'N LIMIT = .500 | | GUIDELINE = 80-100 (A4) | |
| MAR | 54.000 | 65.000 | 65.000 | 66.000 | 71.000 | 70.000 |
| APR | 78.000 | 92.000 | 93.000 | 93.000 | 92.000 | 94.000 |
| MAY | 128.000 | 137.000 | 137.000 | 135.000 | 121.000 | 122.000 |
| JUN | 118.000 | 130.000 | 129.000 | 128.000 | 122.000 | 119.000 |
| JUL | 80.000 | 82.000 | 78.000 | 80.000 | 83.000 | 83.000 |
| AUG | 82.000 | 81.000 | 78.000 | 78.000 | 83.000 | 90.000 |
| SEP | 71.000 | 84.000 | 84.000 | 84.000 | 85.000 | 85.000 |
| OCT | 75.000 | 86.000 | 88.000 | 87.000 | 90.000 | 91.000 |
| NOV | 134.000 | 143.000 | 143.000 | 144.000 | 139.000 | 141.000 |
| DEC | 116.000 | 129.000 | 124.000 | 128.000 | 137.000 | 135.000 |
| IONCAL (DIMNSLESS ) | | | DET'N LIMIT = N/A | | GUIDELINE = N/A | |
| MAR | 2.494 | 3.412 | 3.075 | .505 | 1.630 | 1.356 |
| APR | 1.566 | 5.154 | 4.169 | 5.782 | 1.398 | 6.048 |
| MAY | .045 | 1.729 | .812 | .530 | 1.450 | 1.228 |
| JUN | 4.810 | 7.362 | 8.202 | 7.520 | 7.529 | 3.793 |
| JUL | 3.139 | 2.688 | .977 | 1.837 | .694 | 1.645 |
| AUG | .062 | 2.392 | 4.729 | 3.844 | 3.340 | 2.762 |
| SEP | 3.949 | 2.402 | 1.782 | 1.837 | 1.385 | 1.370 |

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM RENFREW WTP 1989

| | WATER TREATMENT PLANT | | DISTRIBUTION SYSTEM | | | |
|---|---|---|---|---|---|---|
| | RAW | TREATED | SITE 1 | | SITE 2 | |
| | | | STANDING | FREE FLOW | STANDING | FREE FLOW |
| OCT | .796 | .948 | 2.578 | 4.212 | 1.323 | 2.728 |
| NOV | 1.837 | 3.486 | 1.924 | 4.176 | 2.786 | 3.461 |
| DEC | 5.966 | 5.656 | 1.441 | 4.621 | 2.923 | 3.397 |
| LANGELIERS INDEX (DIMNSLESS ) | | | DET'N LIMIT = N/A | | GUIDELINE = N/A | |
| MAR | -.576 | -.845 | -.960 | -.929 | -.930 | -.942 |
| APR | -.118 | -.227 | -.222 | -.272 | -.236 | -.239 |
| MAY | .560 | .421 | .411 | .422 | .301 | .290 |
| JUN | .267 | .118 | .053 | .044 | .009 | .037 |
| JUL | -.430 | -.447 | -.527 | -.464 | -.248 | -.287 |
| AUG | -.425 | -.471 | -.398 | -.468 | -.641 | -.319 |
| SEP | -.334 | -.460 | -.498 | -.441 | -.390 | -.423 |
| OCT | -.204 | -.463 | -.576 | -.548 | -.486 | -.403 |
| NOV | .578 | .359 | .143 | .129 | .005 | .010 |
| DEC | .234 | .000 | -.234 | -.078 | -.013 | .096 |
| MAGNESIUM (MG/L ) | | | DET'N LIMIT = .050 | | GUIDELINE = 30 (F2) | |
| MAR | 3.700 | 3.700 | 3.700 | 3.900 | 3.900 | 3.700 |
| APR | 5.500 | 5.500 | 5.500 | 5.500 | 5.300 | 5.600 |
| MAY | 8.700 | 8.400 | 8.500 | 8.500 | 7.100 | 7.200 |
| JUN | 8.300 | 8.200 | 8.100 | 8.100 | 7.300 | 7.100 |
| JUL | 5.100 | 5.000 | 4.900 | 4.900 | 4.400 | 4.300 |
| AUG | 5.400 | 5.500 | 5.200 | 5.400 | 5.000 | 5.500 |
| SEP | 5.100 | 5.300 | 4.900 | 5.200 | 4.700 | 4.700 |
| OCT | 5.600 | 5.800 | 5.700 | 5.700 | 5.200 | 5.200 |
| NOV | 9.500 | 9.700 | 9.500 | 9.600 | 8.500 | 8.600 |
| DEC | 7.900 | 8.300 | 8.200 | 8.300 | 8.500 | 8.300 |
| SODIUM (MG/L ) | | | DET'N LIMIT = .200 | | GUIDELINE = 200 (C3) | |
| MAR | 2.600 | 2.800 | 3.000 | 2.800 | 3.000 | 3.000 |
| APR | 3.000 | 3.200 | 3.200 | 3.200 | 3.400 | 3.600 |
| MAY | 8.800 | 7.400 | 7.400 | 7.200 | 5.800 | 5.600 |
| JUN | 5.600 | 6.200 | 6.200 | 6.400 | 6.400 | 6.400 |
| JUL | 4.800 | 4.600 | 4.400 | 4.600 | 3.600 | 3.400 |
| AUG | 3.800 | 3.400 | 4.000 | 3.800 | 4.000 | 3.200 |
| SEP | 3.600 | 3.400 | 3.600 | 3.600 | 3.600 | 3.600 |
| OCT | 4.400 | 4.600 | 4.800 | 4.800 | 4.800 | 4.800 |
| NOV | 9.200 | 9.200 | 9.200 | 9.200 | 10.800 | 10.800 |
| DEC | 4.800 | 5.200 | 6.600 | 5.200 | 6.000 | 5.600 |
| AMMONIUM TOTAL (MG/L ) | | | DET'N LIMIT = 0.002 | | GUIDELINE = .05 (F2) | |
| MAR | .014 | .002 <T | .006 <T | .004 <T | .008 <T | .006 <T |
| APR | .018 | .004 <T | .012 | .006 <T | .036 | .046 |
| MAY | .018 | BDL | BDL | BDL | BDL | BDL |
| JUN | .006 <T | BDL | BDL | .004 <T | BDL | .002 <T |
| JUL | .006 <T | .002 <T | .002 <T | .002 <T | BDL | .002 <T |

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM RENFREW WTP 1989

| | WATER TREATMENT PLANT | | DISTRIBUTION SYSTEM | | | |
|---|---|---|---|---|---|---|
| | RAW | TREATED | SITE 1 | | SITE 2 | |
| | | | STANDING | FREE FLOW | STANDING | FREE FLOW |
| AUG | BDL | BDL | .002 <T | .002 <T | .002 <T | BDL |
| SEP | .008 <T | BDL | .002 <T | .002 <T | .004 <T | BDL |
| OCT | .022 | .002 | .002 | BDL | .004 <T | BDL |
| NOV | .006 <T | .004 <T | .008 <T | .008 <T | .002 <T | .004 <T |
| DEC | .010 | BDL | BDL | BDL | BDL | BDL |
| NITRITE (MG/L ) | | | DET'N LIMIT = 0.001 | | GUIDELINE = 1.000 (A1) | |
| MAR | .003 <T | BDL | .001 <T | .001 <T | .002 <T | .001 |
| APR | .004 <T | .001 <T | .001 <T | .001 <T | .002 <T | .002 <T |
| MAY | .010 | .003 <T | .003 <T | .003 <T | .003 <T | .003 <T |
| JUN | .023 | .008 | .007 | .007 | .001 <T | .006 |
| JUL | .003 <T | .001 <T | .001 <T | .001 <T | .001 <T | .002 <T |
| AUG | .003 <T | .002 <T | .003 <T | .002 <T | .003 <T | .003 <T |
| SEP | .004 <T | .004 <T | .004 <T | .004 <T | .004 <T | .004 <T |
| OCT | .002 <T | BDL | .001 <T | .002 <T | .002 <T | .002 <T |
| NOV | .004 <T | .001 <T | .001 <T | .001 <T | .001 <T | .001 <T |
| DEC | .003 <T | .001 <T | .002 <T | .001 <T | .001 <T | .001 <T |
| TOTAL NITRATES (MG/L ) | | | DET'N LIMIT = .020 | | GUIDELINE = 10.000 (A1) | |
| MAR | .050 | .050 | .055 | .050 | .055 | .040 |
| APR | .075 | .085 | .085 | .080 | .165 | .175 |
| MAY | .150 | .080 | .080 | .065 | .050 | .050 |
| JUN | .100 | .015 <T | .025 | .010 <T | .135 | BDL |
| JUL | .060 | .055 | .050 | .050 | .040 | .050 |
| AUG | .015 <T | .005 <T | .010 <T | .005 <T | .015 <T | BDL |
| SEP | BDL | BDL | BDL | BDL | BDL | BDL |
| OCT | .005 <T | .010 <T | .020 <T | .005 <T | .060 | .020 <T |
| NOV | .120 | .095 | .105 | .100 | .115 | .115 |
| DEC | .075 | .085 | .060 | .080 | .100 | .095 |
| NITROGEN TOT KJELD (MG/L ) | | | DET'N LIMIT = .020 | | GUIDELINE = N/A | |
| MAR | .330 | .170 | .190 | .170 | .170 | .160 |
| APR | .340 | .170 | .210 | .170 | .250 | .280 |
| MAY | .480 | .280 | .260 | .260 | .230 | .260 |
| JUN | .480 | .310 | .290 | .310 | .270 | .330 |
| JUL | .330 | .240 | .240 | .240 | .200 | .210 |
| AUG | .220 | .220 | .220 | .220 | .210 | .210 |
| SEP | .430 | .220 | .210 | .210 | .210 | .210 |
| OCT | .360 | .160 | .160 | .160 | .140 | .170 |
| NOV | .430 | .240 | .230 | .220 | .220 | .220 |
| DEC | .320 | .220 | .250 | .190 | .180 | .190 |
| PH (DIMNSLESS ) | | | DET'N LIMIT = N/A | | GUIDELINE = 6.5-8.5(A4) | |
| MAR | 7.930 | 7.740 | 7.630 | 7.660 | 7.550 | 7.560 |
| APR | 8.110 | 8.010 | 8.000 | 7.960 | 7.980 | 7.980 |
| MAY | 8.370 | 8.260 | 8.250 | 8.280 | 8.230 | 8.210 |

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM RENFREW WTP 1989

| | WATER TREATMENT PLANT | | DISTRIBUTION SYSTEM | | | |
|---|---|---|---|---|---|---|
| | RAW | TREATED | SITE 1 | | SITE 2 | |
| | | | STANDING | FREE FLOW | STANDING | FREE FLOW |
| JUN | 8.140 | 8.020 | 7.970 | 7.960 | 7.970 | 8.000 |
| JUL | 7.890 | 7.910 | 7.850 | 7.900 | 8.020 | 8.010 |
| AUG | 7.920 | 7.880 | 7.960 | 7.900 | 7.640 | 7.930 |
| SEP | 7.980 | 7.880 | 7.840 | 7.890 | 7.910 | 7.880 |
| OCT | 8.070 | 7.890 | 7.770 | 7.810 | 7.800 | 7.880 |
| NOV | 8.370 | 8.220 | 8.000 | 7.980 | 7.870 | 7.870 |
| DEC | 8.140 | 7.960 | 7.750 | 7.880 | 7.870 | 7.990 |
| PHOSPHORUS FIL REACT (MG/L ) | | | DET'N LIMIT = .0005 | | GUIDELINE = N/A | |
| MAR | BDL | .008 | . | . | . | . |
| APR | .001 <T | .008 | . | . | . | . |
| MAY | .002 <T | .001 <T | . | . | . | . |
| JUN | .003 | .000 <T | . | . | . | . |
| JUL | .005 | .005 | . | . | . | . |
| AUG | .004 | .006 | . | . | . | . |
| SEP | BDL | .007 | . | . | . | . |
| OCT | .002 <T | .011 | . | . | . | . |
| NOV | .003 | .009 | . | . | . | . |
| DEC | .002 <T | .011 | . | . | . | . |
| PHOSPHORUS TOTAL (MG/L ) | | | DET'N LIMIT = .002 | | GUIDELINE = .40 (F2) | |
| MAR | .009 <T | .011 | . | . | . | . |
| APR | .012 | .011 | . | . | . | . |
| MAY | .025 | .016 | . | . | . | . |
| JUN | .027 | .022 | . | . | . | . |
| JUL | .021 | .012 | . | . | . | . |
| AUG | .011 | .010 | . | . | . | . |
| SEP | .015 | .010 | . | . | . | . |
| OCT | .015 | .011 | . | . | . | . |
| NOV | .028 | .012 | . | . | . | . |
| DEC | .010 | .013 | . | . | . | . |
| SULPHATE (MG/L ) | | | DET'N LIMIT = .200 | | GUIDELINE = 500. (A3) | |
| MAR | 10.840 | 34.030 | 33.700 | 33.000 | 33.160 | 33.520 |
| APR | 9.750 | 31.030 | 31.410 | 31.660 | 31.380 | 30.690 |
| MAY | 14.050 | 34.720 | 34.600 | 34.580 | 33.730 | 33.860 |
| JUN | 8.970 | 31.950 | 32.340 | 32.480 | 30.680 | 31.080 |
| JUL | 26.200 | 31.710 | 31.380 | 31.520 | 30.610 | 30.490 |
| AUG | 33.730 | 32.620 | 32.430 | 32.510 | 32.300 | 32.210 |
| SEP | 10.710 | 34.460 | 34.420 | 34.510 | 34.040 | 34.290 |
| OCT | 14.390 | 38.400 | 38.360 | 38.350 | 38.310 | 38.310 |
| NOV | 15.090 | 40.890 | 41.890 | 40.280 | 40.650 | 40.820 |
| DEC | 13.940 | 41.490 | 44.160 | 41.510 | 42.330 | 42.080 |
| TURBIDITY (FTU ) | | | DET'N LIMIT = .02 | | GUIDELINE = 1.00 (A1) | |
| MAR | 1.850 | .750 | .950 | 1.150 RRV | 1.550 RRV | .800 |

TABLE 5

DRINKING WATER SURVE LLANCE PROGRAM RENFREW WTP 1989

| | WATER TREATMENT PLANT | | DISTRIBUTION SYSTEM | | | |
|---|---|---|---|---|---|---|
| | RAW | TREATED | SITE 1 | | SITE 2 | |
| | | | STANDING | FREE FLOW | STANDING | FREE FLOW |
| APR | 1.800 | .480 | .590 | .470 | .760 | .850 |
| MAY | 6.800 | .710 | .900 | .850 | .590 | .660 |
| JUN | 3.600 | .850 | .910 | .900 | .770 | .600 |
| JUL | 3.900 | .590 | .480 | .670 | .480 | .470 |
| AUG | .910 | .210 <T | .420 | .230 <T | .390 | .360 |
| SEP | 3.000 | .200 <T | .120 <T | .200 <T | .420 | .390 |
| OCT | 3.500 | .290 | .700 | .340 | .440 | .790 |
| NOV | 6.800 | .580 | .570 | .500 | .510 | .490 |
| DEC | 4.600 | .520 | 10.200 RRV | .420 | .890 | .510 |

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM RENFREW WTP 1989

| | WATER TREATMENT PLANT | | DISTRIBUTION SYSTEM | | | |
|---|---|---|---|---|---|---|
| | RAW | TREATED | SITE 1 | | SITE 2 | |
| | | | STANDING | FREE FLOW | STANDING | FREE FLOW |
| METALS | | | | | | |
| SILVER (UG/L ) | | | DET'N LIMIT = .020 | | GUIDELINE = 50. (A1) | |
| MAR | BDL | BDL | .060 <T | BDL | .050 <T | .030 <T |
| APR | .030 <T | .040 <T | .050 <T | BDL | BDL | .030 <T |
| MAY | BDL | .110 <T | BDL | .070 <T | .080 <T | .040 <T |
| JUN | BDL | BDL | BDL | BDL | BDL | BDL |
| JUL | BDL | BDL | BDL | BDL | BDL | BDL |
| AUG | BDL | BDL | BDL | BDL | BDL | BDL |
| SEP | BDL | BDL | BDL | BDL | BDL | .320 <T |
| OCT | BDL | BDL | BDL | BDL | BDL | BDL |
| NOV | BDL | BDL | BDL | BDL | BDL | BDL |
| DEC | BDL | BDL | BDL | BDL | BDL | BDL |
| ALUMINUM (UG/L ) | | | DET'N LIMIT = .050 | | GUIDELINE = 100.(A4) | |
| MAR | 37.120 | 336.400 | 278.400 | 255.200 | 208.800 | 104.400 |
| APR | 52.200 | 67.280 | 76.560 | 60.320 | 106.720 | 106.720 |
| MAY | 243.600 | 359.600 | 290.000 | 301.600 | 60.320 | 174.000 |
| JUN | 110.000 | 510.000 | 380.000 | 390.000 | 340.000 | 340.000 |
| JUL | 270.000 | 89.000 | 57.000 | 98.000 | 39.000 | 53.000 |
| AUG | 300.000 | 39.000 | 45.000 | 7.500 | 29.000 | 36.000 |
| SEP | 100.000 | 43.000 | 31.000 | 29.000 | 24.000 | 33.000 |
| OCT | 150.000 | 30.000 | 32.000 | 33.000 | 18.000 | 27.000 |
| NOV | 140.000 | 78.000 | 110.000 | 71.000 | 33.000 | 46.000 |
| DEC | 72.000 | 200.000 | 490.000 | 160.000 | 88.000 | 67.000 |
| ARSENIC (UG/L ) | | | DET'N LIMIT = 0.050 | | GUIDELINE = 50.0 (A1) | |
| MAR | .370 <T | .990 <T | .820 <T | .850 <T | .940 <T | .570 <T |
| APR | .320 <T | .960 <T | .750 <T | .770 <T | .790 <T | .650 <T |
| MAY | BDL | .350 <T | BDL | .060 <T | .180 <T | .590 <T |
| JUN | .720 <T | 1.200 | 1.100 | .880 <T | 1.100 | 1.100 |
| JUL | .970 <T | 1.400 | 1.000 <T | 1.300 | .970 <T | 1.100 |
| AUG | .930 <T | 1.100 | .600 <T | .440 <T | .590 <T | .750 <T |
| SEP | .580 <T | .920 <T | .580 <T | .800 <T | .790 <T | .890 <T |
| OCT | .130 <T | .650 <T | .440 <T | .570 <T | .390 <T | .330 <T |
| NOV | .150 <T | .610 <T | .800 <T | .550 <T | .530 <T | .640 <T |
| DEC | .190 <T | .550 <T | 1.600 | .450 <T | .470 <T | .250 <T |
| BARIUM (UG/L ) | | | DET'N LIMIT = 0.020 | | GUIDELINE = 1000. (A1) | |
| MAR | 30.000 | 30.000 | 31.000 | 30.000 | 31.000 | 30.000 |
| APR | 33.000 | 32.000 | 31.000 | 31.000 | 33.000 | 31.000 |
| MAY | 40.000 | 37.000 | 36.000 | 36.000 | 31.000 | 37.000 |
| JUN | 47.000 | 44.000 | 42.000 | 44.000 | 43.000 | 45.000 |
| JUL | 37.000 | 35.000 | 36.000 | 35.000 | 36.000 | 36.000 |
| AUG | 37.000 | 38.000 | 38.000 | 20.000 | 42.000 | 39.000 |
| SEP | 37.000 | 36.000 | 39.000 | 35.000 | 36.000 | 38.000 |
| OCT | 33.000 | 30.000 | 30.000 | 31.000 | 35.000 | 35.000 |
| NOV | 35.000 | 32.000 | 36.000 | 32.000 | 38.000 | 38.000 |

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM RENFREW WTP 1989

| | WATER TREATMENT PLANT | | DISTRIBUTION SYSTEM | | | |
|---|---|---|---|---|---|---|
| | RAW | TREATED | SITE 1 | | SITE 2 | |
| | | | STANDING | FREE FLOW | STANDING | FREE FLOW |
| DEC | 36.000 | 34.000 | 35.000 | 33.000 | 46.000 | 35.000 |
| **BORON (UG/L )** | | | DET'N LIMIT = 0.200 | | GUIDELINE = 5000. (A1) | |
| MAR | 30.000 | 11.000 <T | 13.000 <T | 14.000 <T | 23.000 | 22.000 |
| APR | 150.000 | 130.000 | 120.000 | 120.000 | 140.000 | 120.000 |
| MAY | 9.800 <T | 110.000 | 10.000 <T | 110.000 | 29.000 | 43.000 |
| JUN | 38.000 | 33.000 | 33.000 | 37.000 | 30.000 | 34.000 |
| JUL | 23.000 | 22.000 | 22.000 | 23.000 | 23.000 | 22.000 |
| AUG | 26.000 | 27.000 | 27.000 | 9.300 <T | 29.000 | 30.000 |
| SEP | 36.000 | 33.000 | 29.000 | 33.000 | 32.000 | 22.000 |
| OCT | 14.000 <T | 13.000 <T | 14.000 <T | 14.000 <T | 12.000 <T | 13.000 <T |
| NOV | 20.000 <T | 19.000 <T | 15.000 <T | 20.000 <T | 19.000 <T | 19.000 <T |
| DEC | 11.000 <T | 11.000 <T | 11.000 <T | 11.000 <T | 14.000 <T | 11.000 <T |
| **BERYLLIUM (UG/L )** | | | DET'N LIMIT = 0.010 | | GUIDELINE = N/A | |
| MAR | .060 <T | .050 <T | .040 <T | BDL | .090 <T | .030 <T |
| APR | BDL | BDL | .130 <T | BDL | BDL | .080 <T |
| MAY | BDL | BDL | BDL | BDL | BDL | BDL |
| JUN | .160 <T | .080 <T | .060 <T | .150 <T | .080 <T | .080 <T |
| JUL | .100 <T | .060 <T | .110 <T | .070 <T | .050 <T | .070 <T |
| AUG | .110 <T | .070 <T | .040 <T | .060 <T | .060 <T | .060 <T |
| SEP | .060 <T | BDL | .070 <T | .040 <T | BDL | BDL |
| OCT | .040 <T | BDL | .020 <T | .040 <T | BDL | .020 <T |
| NOV | BDL | BDL | BDL | BDL | BDL | BDL |
| DEC | BDL | BDL | BDL | BDL | BDL | BDL |
| **CADMIUM (UG/L )** | | | DET'N LIMIT = 0.050 | | GUIDELINE = 5.000 (A1) | |
| MAR | .170 <T | .070 <T | .280 <T | .120 <T | BDL | BDL |
| APR | BDL | BDL | .450 <T | .080 <T | .060 <T | BDL |
| MAY | BDL | BDL | BDL | BDL | BDL | BDL |
| JUN | BDL | BDL | .490 <T | .080 <T | .100 <T | BDL |
| JUL | BDL | BDL | 3.300 | .090 <T | BDL | BDL |
| AUG | BDL | BDL | 6.900 | BDL | .060 <T | BDL |
| SEP | BDL | BDL | 4.500 | .060 <T | BDL | BDL |
| OCT | BDL | BDL | .360 <T | BDL | .110 <T | BDL |
| NOV | BDL | BDL | 8.500 RRV | BDL | BDL | BDL |
| DEC | BDL | BDL | 4.200 | BDL | BDL | BDL |
| **COBALT (UG/L )** | | | DET'N LIMIT = 0.020 | | GUIDELINE = N/A | |
| MAR | .200 <T | .180 <T | .140 <T | .160 <T | .250 <T | .170 <T |
| APR | .130 <T | .150 <T | .120 <T | .100 <T | .140 <T | .130 <T |
| MAY | .160 <T | BDL | .030 <T | BDL | .230 <T | BDL |
| JUN | .090 <T | .030 <T | .030 <T | .030 <T | BDL | .060 <T |
| JUL | .230 <T | .140 <T | .160 <T | .180 <T | .210 <T | .140 <T |
| AUG | .080 <T | .090 <T | .100 <T | .100 <T | .250 <T | .120 <T |
| SEP | .170 <T | .090 <T | .140 <T | .110 <T | .240 <T | .160 <T |

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM RENFREW WTP 1989

| | WATER TREATMENT PLANT | | DISTRIBUTION SYSTEM | | | |
|---|---|---|---|---|---|---|
| | RAW | TREATED | SITE 1 | | SITE 2 | |
| | | | STANDING | FREE FLOW | STANDING | FREE FLOW |
| OCT | .210 <T | .060 <T | .030 <T | .030 <T | .120 <T | .030 <T |
| NOV | .110 <T | BDL | .130 <T | BDL | .130 <T | BDL |
| DEC | .150 <T | .190 <T | .130 <T | .170 <T | .080 <T | .100 <T |
| CHROMIUM (UG/L ) | | | DET'N LIMIT = 0.100 | | GUIDELINE = 50. (A1) | |
| MAR | 2.800 | .150 <T | .580 <T | .890 <T | 2.200 | 2.000 |
| APR | 5.800 | 4.700 | 4.500 | 4.500 | 5.000 | 4.200 |
| MAY | .380 <T | 8.100 | BDL | 8.000 | 1.700 | 2.800 |
| JUN | 6.900 | 5.600 | 5.700 | 6.600 | 5.100 | 5.800 |
| JUL | 3.500 | 3.000 | 3.300 | 3.500 | 3.400 | 3.100 |
| AUG | 2.800 | 2.900 | 3.000 | BDL | 3.100 | 3.300 |
| SEP | 4.300 | 3.600 | 3.200 | 3.500 | 3.300 | 1.700 |
| OCT | 2.700 | 2.000 | 2.500 | 2.700 | 1.800 | 2.300 |
| NOV | 2.100 | 1.700 | 1.300 | 1.700 | 1.700 | 1.700 |
| DEC | 1.700 <T | BDL | BDL | BDL | BDL | BDL |
| COPPER (UG/L ) | | | DET'N LIMIT = .100 | | GUIDELINE = 1000 (A3) | |
| MAR | .930 <T | 1.300 | 310.000 | 22.000 | 490.000 | 13.000 |
| APR | .790 <T | 3.900 | 110.000 | 18.000 | 380.000 | 14.000 |
| MAY | 1.300 | 1.600 | 51.000 | 17.000 | 1900.000 | 18.000 |
| JUN | 1.500 | 1.700 | 150.000 | 11.000 | 73.000 | 21.000 |
| JUL | 2.200 | 2.900 | 17.000 | 6.900 | 1200.000 | 31.000 |
| AUG | 2.600 | 2.500 | 27.000 | 5.100 | 1700.000 | 31.000 |
| SEP | 1.200 | 1.900 | 17.000 | 6.600 | 1500.000 | 22.000 |
| OCT | 1.100 | 1.800 | 15.000 | 24.000 | 2000.000 | 28.000 |
| NOV | .980 <T | 1.500 | 41.000 | 9.700 | 1900.000 RRV | 19.000 |
| DEC | .720 <T | 1.000 <T | 130.000 | 18.000 | 180.000 | 19.000 |
| IRON (UG/L ) | | | DET'N LIMIT = 4.000 | | GUIDELINE = 300. (A3) | |
| MAR | 75.000 | 18.000 <T | 61.000 | 19.000 <T | 210.000 | 73.000 |
| APR | 89.000 | 9.500 <T | 92.000 | 9.900 <T | 69.000 | 43.000 <T |
| MAY | 270.000 | 17.000 <T | 59.000 | 18.000 <T | 42.000 <T | 61.000 |
| JUN | 210.000 | 31.000 <T | 140.000 | 36.000 <T | 58.000 | 51.000 |
| JUL | 120.000 | 16.000 <T | 86.000 | 35.000 <T | 46.000 <T | 35.000 <T |
| AUG | 16.000 <T | 8.000 <T | 160.000 | BDL | 24.000 <T | 36.000 <T |
| SEP | 160.000 | 12.000 <T | 87.000 | 17.000 <T | 54.000 | 44.000 <T |
| OCT | 210.000 | 11.000 <T | 34.000 <T | 7.000 <T | 77.000 | 67.000 |
| NOV | 210.000 | 5.700 <T | 560.000 | 8.600 <T | 89.000 | 48.000 <T |
| DEC | 120.000 | 14.000 <T | 1300.000 | 18.000 <T | 88.000 | 55.000 <T |
| MERCURY (UG/L ) | | | DET'N LIMIT = 0.010 | | GUIDELINE = 1.000 (A1) | |
| MAR | BDL | .070 | . | BDL | . | .030 <T |
| APR | BDL | BDL | . | BDL | . | BDL |
| MAY | BDL | BDL | . | BDL | . | .020 <T |
| JUN | .020 <T | .020 <T | . | .020 <T | . | .020 <T |
| JUL | .020 <T | BDL | . | BDL | . | BDL |

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM RENFREW WTP 1989

| | WATER TREATMENT PLANT | | DISTRIBUTION SYSTEM | | | |
|---|---|---|---|---|---|---|
| | RAW | TREATED | SITE 1 | | SITE 2 | |
| | | | STANDING | FREE FLOW | STANDING | FREE FLOW |
| AUG | .020 <T | .020 <T | . | BDL | . | .020 <T |
| SEP | BDL | BDL | . | .040 <T | . | BDL |
| OCT | .030 <T | .040 <T | . | .030 <T | . | .020 <T |
| NOV | BDL | BDL | . | .020 <T | . | BDL |
| DEC | BDL | BDL | . | BDL | . | BDL |
| MANGANESE (UG/L ) | | | DET'N LIMIT = .050 | | GUIDELINE = 50.0 (A3) | |
| MAR | 6.300 | 4.400 | 5.500 | 4.700 | 6.900 | 4.000 |
| APR | 13.000 | 11.000 | 12.000 | 10.000 | 13.000 | 12.000 |
| MAY | 29.000 | 13.000 | 14.000 | 12.000 | 9.500 | 8.100 |
| JUN | 37.000 | 11.000 | 13.000 | 10.000 | 8.200 | 8.500 |
| JUL | 14.000 | 4.200 | 15.000 | 4.800 | 7.100 | 3.900 |
| AUG | 5.200 | 3.900 | 21.000 | .100 <T | 6.200 | 4.700 |
| SEP | 25.000 | 3.300 | 31.000 | 2.700 | 6.200 | 3.700 |
| OCT | 18.000 | 4.100 | 4.600 | 3.300 | 7.000 | 4.100 |
| NOV | 17.000 | 6.000 | 35.000 | 5.100 | 11.000 | 5.000 |
| DEC | 11.000 | 9.300 | 32.000 | 8.500 | 9.700 | 7.600 |
| MOLYBDENUM (UG/L ) | | | DET'N LIMIT = 0.020 | | GUIDELINE = N/A | |
| MAR | .450 <T | .310 <T | .440 <T | .320 <T | .390 <T | .300 <T |
| APR | .390 <T | .480 <T | .480 <T | .480 <T | .480 <T | .430 <T |
| MAY | .660 | .560 | .590 | .590 | .650 | .630 |
| JUN | .660 | .690 | .640 | .760 | .560 | .610 |
| JUL | .540 | .560 | .520 | .580 | .460 <T | .530 |
| AUG | .370 <T | .450 <T | .430 <T | .470 <T | .410 <T | .410 <T |
| SEP | .320 <T | .410 <T | .460 <T | .320 <T | .430 <T | .390 <T |
| OCT | .280 <T | .230 <T | .210 <T | .210 <T | .270 <T | .220 <T |
| NOV | .300 <T | .280 <T | .330 <T | .280 <T | .300 <T | .330 <T |
| DEC | .250 <T | .300 <T | .240 <T | .360 <T | .360 <T | .260 <T |
| NICKEL (UG/L ) | | | DET'N LIMIT = 0.100 | | GUIDELINE = 50. (F3) | |
| MAR | .510 <T | .190 <T | .590 <T | .340 <T | 30.000 | .270 <T |
| APR | BDL | 14.000 | BDL | BDL | 4.400 | BDL |
| MAY | BDL | BDL | BDL | BDL | 100.000 | .170 <T |
| JUN | BDL | BDL | BDL | BDL | BDL | BDL |
| JUL | 1.200 <T | 1.700 <T | .930 <T | .980 <T | 45.000 | 1.100 <T |
| AUG | BDL | 1.400 <T | .280 <T | .430 <T | 82.000 | .300 <T |
| SEP | .600 <T | 2.000 <T | .500 <T | .460 <T | 47.000 | BDL |
| OCT | BDL | .610 <T | BDL | BDL | 56.000 | BDL |
| NOV | BDL | BDL | BDL | BDL | 65.000 RRV | BDL |
| DEC | BDL | .320 <T | BDL | BDL | 2.800 | BDL |
| LEAD (UG/L ) | | | DET'N LIMIT = 0.050 | | GUIDELINE = 50. (A1) | |
| MAR | .630 | .600 | 18.000 | .530 | 13.000 | .590 |
| APR | .180 <T | 3.800 | 16.000 | 3.300 | 5.400 | .460 |
| MAY | .470 | .610 | .960 | .490 | 15.000 | .540 |

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM RENFREW WTP 1989

| | WATER TREATMENT PLANT | | DISTRIBUTION SYSTEM | | | |
|---|---|---|---|---|---|---|
| | RAW | TREATED | SITE 1 | | SITE 2 | |
| | | | STANDING | FREE FLOW | STANDING | FREE FLOW |
| JUN | .610 | .530 | 16.000 | .530 | 1.600 | .870 |
| JUL | .680 | .900 | 6.000 | .640 | 17.000 | 1.100 |
| AUG | .440 | .420 | 9.000 | .110 <T | 18.000 | 1.300 |
| SEP | .700 | 1.100 | 3.700 | .600 | 18.000 | .850 |
| OCT | .270 | .130 <T | .450 | .250 | 19.000 | .760 |
| NOV | .450 | .150 <T | 13.000 | .210 | 23.000 | .410 |
| DEC | .110 <T | .170 <T | 43.000 | .250 <T | 4.200 | .660 |
| ANTIMONY (UG/L ) | | | DET'N LIMIT = .050 | | GUIDELINE = 146. (D4) | |
| MAR | .500 | .500 | .600 | .460 | .740 | .660 |
| APR | .490 | .460 | .540 | .580 | .530 | .450 |
| MAY | .550 | .650 | .570 | .600 | .760 | .560 |
| JUN | .600 | .820 | .750 | .640 | .690 | .740 |
| JUL | .740 | .750 | .930 | .640 | .850 | .720 |
| AUG | .580 | .620 | .840 | 1.000 | .720 | .650 |
| SEP | .480 | .520 | .830 | .480 | .640 | .630 |
| OCT | .430 | .360 | .430 | .420 | .570 | .480 |
| NOV | .390 | .440 | 1.100 | .380 | .470 | .430 |
| DEC | .250 <T | .380 <T | .500 <T | .250 <T | .460 <T | .440 <T |
| SELENIUM (UG/L ) | | | DET'N LIMIT = 0.200 | | GUIDELINE = 10. (A1) | |
| MAR | 2.400 <T | 2.200 <T | 4.400 <T | 2.200 <T | 1.600 <T | BDL |
| APR | BDL | BDL | BDL | .740 <T | BDL | BDL |
| MAY | BDL | BDL | BDL | 3.100 <T | 2.400 <T | 1.100 <T |
| JUN | 1.300 <T | 1.900 <T | BDL | BDL | 2.700 <T | 2.300 <T |
| JUL | BDL | 1.800 <T | 2.100 <T | BDL | BDL | BDL |
| AUG | BDL | BDL | BDL | 1.800 <T | 2.400 <T | 1.800 <T |
| SEP | 1.500 <T | 1.200 <T | BDL | BDL | 1.700 <T | BDL |
| OCT | BDL | BDL | BDL | BDL | BDL | BDL |
| NOV | BDL | BDL | 1.400 <T | BDL | BDL | BDL |
| DEC | BDL | BDL | BDL | BDL | BDL | BDL |
| STRONTIUM (UG/L ) | | | DET'N LIMIT = 050 | | GUIDELINE = N/A | |
| MAR | 69.000 | 67.000 | 68.000 | 69.000 | 75.000 | 72.000 |
| APR | 86.000 | 90.000 | 89.000 | 86.000 | 92.000 | 87.000 |
| MAY | 130.000 | 130.000 | 120.000 | 120.000 | 83.000 | 110.000 |
| JUN | 140.000 | 140.000 | 140.000 | 140.000 | 130.000 | 130.000 |
| JUL | 89.000 | 86.000 | 86.000 | 86.000 | 88.000 | 90.000 |
| AUG | 91.000 | 93.000 | 92.000 | 59.000 | 98.000 | 98.000 |
| SEP | 83.000 | 85.000 | 87.000 | 87.000 | 90.000 | 94.000 |
| OCT | 88.000 | 90.000 | 88.000 | 89.000 | 94.000 | 92.000 |
| NOV | 130.000 | 130.000 | 100.000 | 130.000 | 120.000 | 120.000 |
| DEC | 110.000 | 120.000 | 120.000 | 120.000 | 150.000 | 130.000 |
| TITANIUM (UG/L ) | | | DET'N LIMIT = .050 | | GUIDELINE = N/A | |
| MAR | 8.500 | 7.200 | 7.500 | 7.200 | 6.900 | 6.800 |

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM RENFREW WTP 1989

| | WATER TREATMENT PLANT | | DISTRIBUTION SYSTEM | | | |
|---|---|---|---|---|---|---|
| | RAW | TREATED | SITE 1 | | SITE 2 | |
| | | | STANDING | FREE FLOW | STANDING | FREE FLOW |
| APR | 9.600 | 6.900 | 7.200 | 6.800 | 7.300 | 7.300 |
| MAY | 22.000 | 11.000 | 8.100 | 7.900 | 8.200 | 9.000 |
| JUN | 18.000 | 12.000 | 13.000 | 12.000 | 13.000 | 12.000 |
| JUL | 17.000 | 10.000 | 9.700 | 10.000 | 9.900 | 9.700 |
| AUG | 9.200 | 9.100 | 8.200 | 4.800 | 9.200 | 9.200 |
| SEP | 15.000 | 7.800 | 8.400 | 8.300 | 8.400 | 9.300 |
| OCT | 18.000 | 7.000 | 6.600 | 7.100 | 6.900 | 7.400 |
| NOV | 15.000 | 6.200 | 6.400 | 5.900 | 5.700 | 5.900 |
| DEC | 15.000 | 9.300 | 14.000 | 9.800 | 11.000 | 10.000 |
| THALLIUM (UG/L ) | | | DET'N LIMIT = .010 | | GUIDELINE = 13. (D4) | |
| MAR | BDL | BDL | BDL | BDL | .020 <T | BDL |
| APR | BDL | BDL | BDL | BDL | BDL | BDL |
| MAY | .070 <T | .060 <T | BDL | BDL | .130 <T | .090 <T |
| JUN | BDL | BDL | .050 <T | BDL | BDL | BDL |
| JUL | .020 <T | .040 <T | .030 <T | BDL | .060 <T | BDL |
| AUG | .050 <T | .050 <T | .060 <T | .090 <T | .090 <T | .030 <T |
| SEP | BDL | BDL | BDL | BDL | BDL | BDL |
| OCT | BDL | BDL | BDL | BDL | BDL | BDL |
| NOV | BDL | BDL | .020 <T | BDL | BDL | BDL |
| DEC | BDL | BDL | BDL | BDL | BDL | BDL |
| URANIUM (UG/L ) | | | DET'N LIMIT = .020 | | GUIDELINE = 20. (A2) | |
| MAR | .150 <T | .070 <T | .080 <T | .080 <T | .080 <T | .040 <T |
| APR | .400 | .110 <T | .140 <T | .050 <T | .050 <T | .070 <T |
| MAY | .700 | .250 | .190 <T | .230 | .130 <T | .170 <T |
| JUN | .530 | .200 <T | .170 <T | .190 <T | .190 <T | .220 |
| JUL | .210 | .110 <T | .040 <T | .040 <T | BDL | .050 <T |
| AUG | .200 <T | .050 <T | .040 <T | .080 <T | .030 <T | BDL |
| SEP | .100 <T | BDL | BDL | BDL | BDL | BDL |
| OCT | .130 <T | BDL | BDL | BDL | BDL | BDL |
| NOV | .560 | .100 <T | .060 <T | .090 <T | .060 <T | .100 <T |
| DEC | .280 <T | BDL | .100 <T | BDL | .100 <T | .060 <T |
| VANADIUM (UG/L ) | | | DET'N LIMIT = .050 | | GUIDELINE = N/A | |
| MAR | .240 <T | .170 <T | .180 <T | .180 <T | .350 <T | .180 <T |
| APR | .380 <T | .280 <T | .260 <T | .260 <T | .270 <T | .250 <T |
| MAY | .750 | .370 <T | .290 <T | .310 <T | .130 <T | .270 <T |
| JUN | .810 | .580 | .360 <T | .500 <T | .460 <T | .470 <T |
| JUL | .750 | .510 | .380 <T | .510 | .350 <T | .430 <T |
| AUG | .460 <T | .430 <T | .460 <T | .370 <T | .320 <T | .440 <T |
| SEP | .640 | .330 <T | .280 <T | .340 <T | .230 <T | .390 <T |
| OCT | .680 | .260 <T | .190 <T | .210 <T | .190 <T | .240 <T |
| NOV | .790 | .440 <T | .580 | .360 <T | .350 <T | .360 <T |
| DEC | .350 <T | .220 <T | 1.100 | .190 <T | .460 <T | .170 <T |
| ZINC (UG/L ) | | | DET'N LIMIT = .001 | | GUIDELINE = 5000. (A3) | |

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM RENFREW WTP 1989

| | WATER TREATMENT PLANT | | DISTRIBUTION SYSTEM | | | |
|---|---|---|---|---|---|---|
| | RAW | TREATED | SITE 1 | | SITE 2 | |
| | | | STANDING | FREE FLOW | STANDING | FREE FLOW |
| MAR | 1.600 | 2.100 | 170.000 | 19.000 | 59.000 | 2.200 |
| APR | 1.100 | 6.800 | 100.000 | 16.000 | 32.000 | 2.600 |
| MAY | 3.400 | 3.900 | 43.000 | 13.000 | 130.000 | 2.800 |
| JUN | 2.900 | 4.900 | 160.000 | 13.000 | 7.600 | 3.300 |
| JUL | 4.400 | 7.300 | 1700.000 | 46.000 | 88.000 | 3.800 |
| AUG | 3.800 | 6.600 | 3700.000 | 8.300 | 210.000 | 4.600 |
| SEP | 1.900 | 3.000 | 3100.000 | 45.000 | 210.000 | 3.500 |
| OCT | 2.000 | 5.000 | 290.000 | 22.000 | 220.000 | 2.400 |
| NOV | 3.200 | 3.800 | 6100.000 RRV | 20.000 | 150.000 RRV | 2.600 |
| DEC | 1.400 <T | 2.800 | 4300.000 | 19.000 | 28.000 | 3.500 |

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM RENFREW WTP 1989

| | WATER TREATMENT PLANT | | DISTRIBUTION SYSTEM | | | |
|---|---|---|---|---|---|---|
| | RAW | TREATED | SITE 1 | | SITE 2 | |
| | | | STANDING | FREE FLOW | STANDING | FREE FLOW |
| | PESTICIDES & PCB | | | | | |
| ALPHA BHC (NG/L ) | | | DET'N LIMIT = 1.000 | | GUIDELINE = 700 (G) | |
| MAR | 1.000 <T | 2.000 <T | . | 1.000 <T | . | 1.000 <T |
| APR | BDL | BDL | . | BDL | . | BDL |
| MAY | BDL | BDL | . | BDL | . | BDL |
| JUN | BDL | BDL | . | BDL | . | BDL |
| JUL | BDL | ILA | . | BDL | . | BDL |
| AUG | BDL | BDL | . | BDL | . | BDL |
| SEP | BDL | BDL | . | 2.000 <T | . | BDL |
| OCT | BDL | BDL | . | BDL | . | BDL |
| NOV | 2.000 <T | 2.000 <T | . | 2.000 <T | . | 1.000 <T |
| DEC | BDL | BDL | . | BDL | . | BDL |

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM RENFREW WTP 1989

| | WATER TREATMENT PLANT | | DISTRIBUTION SYSTEM | | | |
|---|---|---|---|---|---|---|
| | RAW | TREATED | SITE 1 | | SITE 2 | |
| | | | STANDING | FREE FLOW | STANDING | FREE FLOW |
| PHENOLICS (UG/L PHENOLICS) | | | DET'N LIMIT = 0.2 | | GUIDELINE = 2.00 (A3) | |
| MAR | 2.000 | 2.000 | . | . | . | . |
| APR | 3.000 | 2.600 | . | . | . | . |
| MAY | 2.400 | 2.200 | . | . | . | . |
| JUN | 2.600 | 1.600 | . | . | . | . |
| JUL | 1.600 | 1.600 | . | . | . | . |
| AUG | .800 <T | 1.000 | . | . | . | . |
| SEP | 3.000 | 1.600 | . | . | . | . |
| OCT | 2.000 | 1.600 | . | . | . | . |
| NOV | 1.000 | .800 <T | . | . | . | . |
| DEC | 2.000 | 1.400 | . | . | . | . |

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM RENFREW WTP 1989

| | WATER TREATMENT PLANT | | DISTRIBUTION SYSTEM | | | |
|---|---|---|---|---|---|---|
| | RAW | TREATED | SITE 1 | | SITE 2 | |
| | | | STANDING | FREE FLOW | STANDING | FREE FLOW |
| **VOLATILES** | | | | | | |
| **BENZENE (UG/L )** | | | DET'N LIMIT = .050 | | GUIDELINE = 5.0 (B1) | |
| MAR | BDL | BDL | . | BDL | . | BDL |
| APR | BDL | BDL | . | BDL | . | BDL |
| MAY | BDL | BDL | . | .050 <T | . | BDL |
| JUN | BDL | .050 <T | . | .050 <T | . | BDL |
| JUL | BDL | BDL | . | BDL | . | BDL |
| AUG | BDL | IU | . | BDL | . | BDL |
| SEP | BDL | BDL | . | BDL | . | BDL |
| OCT | BDL | BDL | . | BDL | . | BDL |
| NOV | BDL | BDL | . | BDL | . | BDL |
| DEC | BDL | BDL | . | BDL | . | IU |
| **TOLUENE (UG/L )** | | | DET'N LIMIT = .050 | | GUIDELINE = 24.0 (B4) | |
| MAR | BDL | BDL | . | BDL | . | BDL |
| APR | BDL | BDL | . | BDL | . | .050 <T |
| MAY | BDL | .150 <T | . | .050 <T | . | .050 <T |
| JUN | BDL | .150 <T | . | .100 <T | . | BDL |
| JUL | BDL | BDL | . | BDL | . | BDL |
| AUG | BDL | IU | . | .100 <T | . | .050 <T |
| SEP | BDL | .050 <T | . | BDL | . | BDL |
| OCT | BDL | .100 <T | . | .050 <T | . | BDL |
| NOV | BDL | BDL | . | BDL | . | BDL |
| DEC | BDL | .050 <T | . | .050 <T | . | IU |
| **ETHYLBENZENE (UG/L )** | | | DET'N LIMIT = .050 | | GUIDELINE = 2.4 (B4) | |
| MAR | BDL | .050 <T | . | .050 <T | . | BDL |
| APR | .050 <T | .050 <T | . | .050 <T | . | .050 <T |
| MAY | BDL | .050 <T | . | BDL | . | BDL |
| JUN | BDL | .050 <T | . | .050 <T | . | BDL |
| JUL | BDL | BDL | . | BDL | . | BDL |
| AUG | BDL | IU | . | BDL | . | BDL |
| SEP | BDL | BDL | . | BDL | . | BDL |
| OCT | BDL | BDL | . | BDL | . | BDL |
| NOV | BDL | BDL | . | BDL | . | BDL |
| DEC | BDL | .050 <T | . | BDL | . | IU |
| **M-XYLENE (UG/L )** | | | DET'N LIMIT = .100 | | GUIDELINE = 300 (B4) | |
| MAR | BDL | BDL | . | BDL | . | BDL |
| APR | BDL | BDL | . | BDL | . | BDL |
| MAY | BDL | .100 <T | . | BDL | . | BDL |
| JUN | BDL | BDL | . | .100 <T | . | BDL |
| JUL | BDL | BDL | . | BDL | . | BDL |
| AUG | BDL | IU | . | BDL | . | BDL |
| SEP | BDL | BDL | . | BDL | . | BDL |
| OCT | BDL | BDL | . | BDL | . | BDL |
| NOV | BDL | BDL | . | BDL | . | BDL |

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM RENFREW WTP 1989

| | WATER TREATMENT PLANT | | DISTRIBUTION SYSTEM | | | |
|---|---|---|---|---|---|---|
| | RAW | TREATED | SITE 1 | | SITE 2 | |
| | | | STANDING | FREE FLOW | STANDING | FREE FLOW |
| DEC | BDL | BDL | . | BDL | . | IU |
| O-XYLENE (UG/L ) | | | DET'N LIMIT = .050 | | GUIDELINE = 300 (B4) | |
| MAR | BDL | BDL | . | BDL | . | BDL |
| APR | BDL | BDL | . | BDL | . | BDL |
| MAY | BDL | .100 <T | . | .050 <T | . | BDL |
| JUN | BDL | .050 <T | . | .050 <T | . | BDL |
| JUL | BDL | BDL | . | BDL | . | BDL |
| AUG | BDL | IU | . | BDL | . | BDL |
| SEP | BDL | BDL | . | BDL | . | BDL |
| OCT | BDL | BDL | . | BDL | . | BDL |
| NOV | BDL | BDL | . | BDL | . | BDL |
| DEC | BDL | BDL | . | BDL | . | IU |
| STYRENE (UG/L ) | | | DET'N LIMIT = .050 | | GUIDELINE = 46.5 (D2) | |
| MAR | BDL | .100 <T | . | .200 <T | . | .050 <T |
| APR | .350 <T | .150 <T | . | .250 <T | . | .350 <T |
| MAY | BDL | .100 <T | . | BDL | . | .100 <T |
| JUN | .050 <T | .300 <T | . | .250 <T | . | .150 <T |
| JUL | .100 <T | .050 <T | . | BDL | . | .200 <T |
| AUG | BDL | IU | . | .100 <T | . | .150 <T |
| SEP | BDL | BDL | . | .100 <T | . | .100 <T |
| OCT | BDL | .050 <T | . | .050 <T | . | .100 <T |
| NOV | BDL | .150 <T | . | .100 <T | . | .100 <T |
| DEC | .050 <T | .200 <T | . | .150 <T | . | IU |
| CHLOROFORM (UG/L ) | | | DET'N LIMIT = .100 | | GUIDELINE = 350 (A1+) | |
| MAR | .300 <T | 56.500 | . | 45.500 | . | 34.300 |
| APR | .400 <T | 46.800 | . | 45.600 | . | 30.600 |
| MAY | .600 <T | 45.600 | . | 48.600 | . | 42.700 |
| JUN | .700 <T | 65.000 | . | 61.200 | . | 57.300 |
| JUL | 33.300 | 50.100 | . | 41.600 | . | 38.800 |
| AUG | 47.500 | IU | . | 46.400 | . | 42.500 |
| SEP | .400 <T | 51.900 | . | 34.500 | . | 36.100 |
| OCT | .500 <T | 48.200 | . | 52.900 | . | 35.600 |
| NOV | .500 <T | 53.000 | . | 51.900 | . | 37.400 |
| DEC | .500 <T | 61.600 | . | 56.300 | . | IU |
| 111, TRICHLOROETHANE (UG/L ) | | | DET'N LIMIT = .020 | | GUIDELINE = 200 (D1) | |
| MAR | BDL | BDL | . | BDL | . | BDL |
| APR | BDL | BDL | . | BDL | . | BDL |
| MAY | .020 <T | BDL | . | BDL | . | BDL |
| JUN | BDL | BDL | . | BDL | . | BDL |
| JUL | BDL | BDL | . | BDL | . | BDL |
| AUG | BDL | IU | . | BDL | . | BDL |
| SEP | BDL | BDL | . | BDL | . | BDL |

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM RENFREW WTP 1989

| | WATER TREATMENT PLANT | | DISTRIBUTION SYSTEM | | | |
|---|---|---|---|---|---|---|
| | RAW | TREATED | SITE 1 | | SITE 2 | |
| | | | STANDING | FREE FLOW | STANDING | FREE FLOW |
| OCT | BDL | BDL | . | BDL | . | BDL |
| NOV | .100 <T | BDL | . | BDL | . | BDL |
| DEC | BDL | BDL | . | BDL | . | IU |
| DICHLOROBROMOMETHANE (UG/L ) | | | DET'N LIMIT = .050 | | GUIDELINE = 350 (A1+) | |
| MAR | BDL | 3.100 | . | 2.700 | . | 2.000 |
| APR | BDL | 2.850 | . | 2.750 | . | 1.900 |
| MAY | BDL | 4.300 | . | 4.100 | . | 3.300 |
| JUN | BDL | 4.100 | . | 4.200 | . | 4.450 |
| JUL | 2.850 | 4.400 | . | 3.900 | . | 2.700 |
| AUG | 3.550 | IU | . | 3.600 | . | 3.500 |
| SEP | .100 <T | 3.900 | . | 2.950 | . | 2.950 |
| OCT | BDL | 4.200 | . | 4.350 SPS | . | 3.350 |
| NOV | BDL | 7.700 | . | 7.400 | . | 6.900 |
| DEC | .050 <T | 4.650 | . | 4.400 | . | IU |
| CHLORODIBROMOMETHANE (UG/L ) | | | DET'N LIMIT = .100 | | GUIDELINE = 350 (A1+) | |
| MAR | BDL | BDL | . | .200 <T | . | .100 <T |
| APR | BDL | .100 <T | . | .100 <T | . | BDL |
| MAY | BDL | BDL | . | BDL | . | .400 <T |
| JUN | BDL | BDL | . | BDL | . | BDL |
| JUL | .300 <T | .400 <T | . | .400 <T | . | .200 <T |
| AUG | .300 <T | IU | . | .400 <T | . | .300 <T |
| SEP | BDL | .300 <T | . | .200 <T | . | .200 <T |
| OCT | BDL | .400 <T | . | BDL | . | .200 <T |
| NOV | BDL | .500 <T | . | .800 <T | . | .800 <T |
| DEC | BDL | .300 <T | . | .300 <T | . | IU |
| 1,4 DICHLOROBENZENE (UG/L ) | | | DET'N LIMIT = .100 | | GUIDELINE = 5.0 (B1) | |
| MAR | BDL | BDL | . | BDL | . | BDL |
| APR | BDL | .100 <T | . | BDL | . | .100 <T |
| MAY | BDL | BDL | . | .100 <T | . | BDL |
| JUN | BDL | BDL | . | BDL | . | BDL |
| JUL | BDL | BDL | . | BDL | . | BDL |
| AUG | BDL | IU | . | BDL | . | BDL |
| SEP | BDL | BDL | . | BDL | . | BDL |
| OCT | BDL | .100 <T | . | BDL | . | BDL |
| NOV | BDL | BDL | . | .100 <T | . | BDL |
| DEC | BDL | BDL | . | BDL | . | IU |
| 1,2 DICHLOROBENZENE (UG/L ) | | | DET'N LIMIT = .050 | | GUIDELINE = 200 (B1) | |
| MAR | BDL | BDL | . | BDL | . | BDL |
| APR | BDL | BDL | . | BDL | . | BDL |
| MAY | BDL | BDL | . | BDL | . | BDL |
| JUN | BDL | BDL | . | BDL | . | BDL |
| JUL | BDL | BDL | . | BDL | . | BDL |

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM RENFREW WTP 1989

| | WATER TREATMENT PLANT | | DISTRIBUTION SYSTEM | | | |
|---|---|---|---|---|---|---|
| | RAW | TREATED | SITE 1 | | SITE 2 | |
| | | | STANDING | FREE FLOW | STANDING | FREE FLOW |
| AUG | BDL | IU | . | BDL | . | BDL |
| SEP | BDL | .400 <T | . | BDL | . | BDL |
| OCT | BDL | BDL | . | BDL | . | BDL |
| NOV | BDL | BDL | . | BDL | . | BDL |
| DEC | BDL | BDL | . | BDL | . | IU |
| TOTL TRIHALOMETHANES (UG/L ) | | | DET'N LIMIT = .500 | | GUIDELINE = 350 (A1) | |
| MAR | BDL | 59.600 | . | 48.400 | . | 36.400 |
| APR | BDL | 49.750 | . | 48.450 | . | 32.500 |
| MAY | BDL | 49.900 | . | 52.700 | . | 46.400 |
| JUN | .700 <T | 69.100 | . | 65.400 | . | 61.750 |
| JUL | 36.450 | 54.900 | . | 45.900 | . | 41.700 |
| AUG | 51.350 | IU | . | 50.400 | . | 46.700 |
| SEP | .500 <T | 56.100 | . | 37.650 | . | 39.250 |
| OCT | .500 <T | 52.800 | . | 57.250 | . | 39.150 |
| NOV | .500 <T | 61.200 | . | 60.100 | . | 45.100 |
| DEC | .550 <T | 66.550 | . | 60.950 | . | IU |

TRACE LEVELS OF TOLUENE ARE LABORATORY ARTIFACTS DERIVED FROM THE ANALYTICAL METHODOLOGY.

TRACE LEVELS OF STYRENE ARE CONSIDERED TO BE LABORATORY ARTIFACTS RESULTING FROM THE LABORATORY SHIPPING CONTAINERS.

Table 6

| SCAN/PARAMETER | UNIT | DETECTION LIMIT | GUIDELINE |
|---|---|---|---|
| **BACTERIOLOGICAL** | | | |
| STANDARD PLATE COUNT MEMBRANE FILTRATION | CT/ML | 0 | 500/ML(A1) |
| P/A BOTTLE | | 0 | 0 (A1*) |
| TOTAL COLIFORM MEMBRANE FILTRATION | CT/100ML | 0 | 5/100mL(A1) |
| TOTAL COLIFORM BACKGROUND MF | CT/100ML | 0 | N/A |
| **CHLOROAROMATICS** | | | |
| HEXACHLOROBUTADIENE | NG/L | 1.000 | 450. (D4) |
| 1,2,3-TRICHLOROBENZENE | NG/L | 5.000 | 10000 (I) |
| 1,2,3,4-TETRACHLOROBENZENE | NG/L | 1.000 | 10000 (I) |
| 1,2,3,5-TETRACHLOROBENZENE | NG/L | 1.000 | 10000 (I) |
| 1,2,4-TRICHLOROBENZENE | NG/L | 5.000 | 10000 (I) |
| 1,2,4,5-TETRACHLOROBENZENE | NG/L | 1.000 | 38000 (D4) |
| 1,3,5-TRICHLOROBENZENE | NG/L | 5.000 | 10000 (D4) |
| HEXACHLOROBENZENE | NG/L | 1.0 | 10. (C1) |
| HEXACHLOROETHANE | NG/L | 1.000 | 1900. (D4) |
| OCTACHLOROSTYRENE | NG/L | 1.000 | N/A |
| PENTACHLOROBENZENE | NG/L | 1.000 | 74000 (D4) |
| 2,3,6-TRICHLOROTOLUENE | NG/L | 5.000 | N/A |
| 2,4,5-TRICHLOROTOLUENE | NG/L | 5.000 | N/A |
| 2,6,A-TRICHLOROTOLUENE | NG/L | 5.000 | N/A |
| **CHLOROPHENOLS** | | | |
| 2,3,4-TRICHLOROPHENOL | NG/L | 50. | N/A |
| 2,3,4,5-TETRACHLOROPHENOL | NG/L | 50. | N/A |
| 2,3,5,6-TETRACHLOROPHENOL | NG/L | 50. | N/A |
| 2,4,5-TRICHLOROPHENOL | NG/L | 50. | 2600000 (D4) |
| 2,4,6-TRICHLOROPHENOL | NG/L | 50. | 2000. (B4) |
| PENTACHLOROPHENOL | NG/L | 50. | 30000. (B4) |
| **CHEMISTRY (FLD)** | | | |
| FIELD COMBINED CHLORINE RESIDUAL | MG/L | N/A | N/A |
| FIELD FREE CHLORINE RESIDUAL | MG/L | N/A | N/A |
| FIELD TOTAL CHLORINE RESIDUAL | MG/L | N/A | N/A |
| FIELD PH | DMSNLESS | N/A | 6.5-8.5(A4) |
| FIELD TEMPERATURE | °C | N/A | <15 °C(A1) |
| FIELD TURBIDITY | FTU | N/A | 1.0 (A1) |
| **CHEMISTRY (LAB)** | | | |
| ALKALINITY | MG/L | .200 | 30-500(A4) |
| CALCIUM | MG/L | .100 | 100. (F2) |
| CYANIDE | MG/L | .001 | .20(A1) |
| CHLORIDE | MG/L | .200 | 250. (A3) |
| COLOUR | TCU | .5 | 5.0 (A3) |
| CONDUCTIVITY | UMHO/CM | 1. | 400. (F2) |
| FLUORIDE | MG/L | .01 | 2.4 (A1) |
| HARDNESS | MG/L | .50 | 80-100(A4) |
| MAGNESIUM | MG/L | .05 | 30. (F2) |

| SCAN/PARAMETER | UNIT | DETECTION LIMIT | GUIDELINE |
|---|---|---|---|
| NITRITE | MG/L | .001 | 1.0 (A1) |
| TOTAL NITRATES | MG/L | .02 | 10. (A1) |
| NITROGEN TOTAL KJELDAHL | MG/L | .02 | N/A |
| PH | DMSNLESS | N/A | 6.5-8.5(A4) |
| PHOSPHORUS FIL REACT | MG/L | .0005 | N/A |
| PHOSPHORUS TOTAL | MG/L | .002 | .40(F2) |
| TOTAL SOLIDS | MG/L | 1. | 500. (A3) |
| TURBIDITY | FTU | .02 | 1.0 (A1) |
| **METALS** | | | |
| ALUMINUM | UG/L | .050 | 100. (A4) |
| ANTIMONY | UG/L | .050 | 10. (F3) |
| ARSENIC | UG/L | .050 | 50. (A1) |
| BARIUM | UG/L | .020 | 1000. (A1) |
| BORON | UG/L | .200 | 5000. (A1) |
| BERYLLIUM | UG/L | .010 | 0.20 (H) |
| CADMIUM | UG/L | .050 | 5.0 (A1) |
| COBALT | UG/L | .020 | 1000. (H) |
| CHROMIUM | UG/L | .100 | 50. (A1) |
| COPPER | UG/L | .100 | 1000. (A3) |
| IRON | UG/L | 5.0 | 300. (A3) |
| MERCURY | UG/L | .01 | 1.0 (A1) |
| MANGANESE | UG/L | .050 | 50. (A3) |
| MOLYBDENUM | UG/L | .020 | 500. (H) |
| NICKEL | UG/L | .100 | 50. (F3) |
| LEAD | UG/L | .020 | 50. (A1) |
| SELENIUM | UG/L | .200 | 10. (A1) |
| SILVER | UG/L | .020 | 50. (A1) |
| STRONTIUM | UG/L | .100 | 2000. (H) |
| THALLIUM | UG/L | .010 | 13. (D4) |
| TITANIUM | UG/L | .100 | N/A |
| URANIUM | UG/L | .020 | 20. (A2) |
| VANADIUM | UG/L | .020 | 100. (H) |
| ZINC | UG/L | .020 | 5000. (A3) |
| **PHENOLICS** | | | |
| PHENOLICS (UNFILTERED REACTIVE) | UG/L | .2 | 2.0 (A3) |
| **PESTICIDES & PCB** | | | |
| ALDRIN | NG/L | 1.0 | 700. (A1) |
| AMETRINE | NG/L | 50. | 300000. (D3) |
| ATRAZINE | NG/L | 50. | 60000. (B3) |
| ALPHA HEXACHLOROCYCLOHEXANE (BHC) | NG/L | 1.0 | 700. (G) |
| BETA HEXACHLOROCYCLOHEXANE (BHC) | NG/L | 1.0 | 300. (G) |
| GAMMA HEXACHLOROCYCLOHEXANE(LINDANE) | NG/L | 1.0 | 4000. (A1) |
| ALPHA CHLORDANE | NG/L | 2.0 | 7000. (A1) |
| GAMMA CHLORDANE | NG/L | 2.0 | 7000. (A1) |
| BLADEX | NG/L | 100. | 10000. (B3) |
| DIELDRIN | NG/L | 2.0 | 700. (A1) |
| METHOXYCHLOR | NG/L | 5.0 | 900000. (B1) |
| ENDOSULFAN 1 (THIODAN I) | NG/L | 2.0 | 74000. (D4) |
| ENDOSULFAN 2 (THIODAN II) | NG/L | 4.0 | 74000. (D4) |
| ENDRIN | NG/L | 4.0 | 200. (A1) |
| ENDOSULFAN SULPHATE(THIODAN SULPHATE) | NG/L | 4.0 | N/A |
| HEPTACHLOR EPOXIDE | NG/L | 1.0 | 3000. (A1) |

| SCAN/PARAMETER | UNIT | DETECTION LIMIT | GUIDELINE | |
|---|---|---|---|---|
| HEPTACHLOR | NG/L | 1.0 | 3000. | (A1) |
| METOLACHLOR | NG/L | 500. | 50000. | (B3) |
| MIREX | NG/L | 5.0 | N/A | |
| OXYCHLORDANE | NG/L | 2.0 | N/A | |
| O,P-DDT | NG/L | 5.0 | 30000. | (A1) |
| PCB | NG/L | 20.0 | 3000. | (A2) |
| O,P-DDD | NG/L | 5.0 | N/A | |
| PPDDE | NG/L | 1.0 | 30000. | (A1) |
| PPDDT | NG/L | 5.0 | 30000. | (A1) |
| ATRATONE | NG/L | 50. | N/A | |
| ALACHLOR | NG/L | 500. | 35000. | (D2) |
| PROMETONE | NG/L | 50. | 52500. | (D3) |
| PROPAZINE | NG/L | 50. | 16000. | (D2) |
| PROMETRYNE | NG/L | 50. | 1000. | (B3) |
| SENCOR (METRIBUZIN) | NG/L | 100. | 80000. | (B2) |
| SIMAZINE | NG/L | 50. | 10000. | (B3) |
| **POLYAROMATIC HYDROCARBONS** | | | | |
| PHENANTHRENE | NG/L | 10.0 | N/A | |
| ANTHRACENE | NG/L | 1.0 | N/A | |
| FLUORANTHENE | NG/L | 20.0 | 42000. | (D4) |
| PYRENE | NG/L | 20.0 | N/A | |
| BENZO(A)ANTHRACENE | NG/L | 20.0 | N/A | |
| CHRYSENE | NG/L | 50.0 | N/A | |
| DIMETHYL BENZO(A)ANTHRACENE | NG/L | 5.0 | N/A | |
| BENZO(E)PYRENE | NG/L | 50.0 | N/A | |
| BENZO(B)FLUORANTHENE | NG/L | 10.0 | N/A | |
| PERYLENE | NG/L | 10.0 | N/A | |
| BENZO(K)FLUORANTHENE | NG/L | 1.0 | N/A | |
| BENZO(A)PYRENE | NG/L | 5.0 | 10. | (B1) |
| BENZO(G,H,I)PERYLENE | NG/L | 20.0 | N/A | |
| DIBENZO(A,H)ANTHRACENE | NG/L | 10.0 | N/A | |
| INDENO(1,2,3-C,D)PYRENE | NG/L | 20.0 | N/A | |
| BENZO(B)CHRYSENE | NG/L | 2.0 | N/A | |
| CORONENE | NG/L | 10.0 | N/A | |
| **SPECIFIC PESTICIDES** | | | | |
| TOXAPHENE | NG/L | N/A | 5000. | (A1) |
| 2,4,5-TRICHLOROBUTYRIC ACID (2,4,5-T) | NG/L | 50. | 200000. | (B4) |
| 2,4-DICHLOROBUTYRIC ACID (2,4-D) | NG/L | 100. | 100000. | (A1) |
| 2,4-DICHLOROPHENOXYBUTYRIC ACID | NG/L | 200. | 18000. | (B3) |
| 2,4-D PROPIONIC ACID | NG/L | 100. | N/A | |
| DICAMBA | NG/L | 100. | 120000. | (B1) |
| PICLORAM | NG/L | 100. | 190000. | (B3) |
| SILVEX (2,4,5-TP) | NG/L | 50. | 10000. | (A1) |
| DIAZINON | NG/L | 20. | 20000. | (B1) |
| DICHLOROVOS | NG/L | 20. | N/A | |
| DURSBAN | NG/L | 20. | N/A | |
| ETHION | NG/L | 20. | 35000. | (G) |
| GUTHION(AZINPHOSMETHYL) | NG/L | N/A | 20000. | (B1) |
| MALATHION | NG/L | 20. | 190000. | (B1) |
| MEVINPHOS | NG/L | 20. | N/A | |
| METHYL PARATHION | NG/L | 50. | 7000. | (A1) |
| METHYLTRITHION | NG/L | 20. | N/A | |
| PARATHION | NG/L | 20. | 50000. | (B1) |

| SCAN/PARAMETER | UNIT | DETECTION LIMIT | GUIDELINE |
|---|---|---|---|
| PHORATE (THIMET) | NG/L | 20. | 2000. (B3) |
| RELDAN | NG/L | 20. | N/A |
| RONNEL | NG/L | 20. | N/A |
| AMINOCARB | NG/L | N/A | N/A |
| BENONYL | NG/L | N/A | N/A |
| BUX (METALKAMATE) | NG/L | 2000. | N/A |
| CARBOFURAN | NG/L | 2000. | 90000. (B1) |
| CICP (CHLORPROPHAM) | NG/L | 2000. | 350000. (G) |
| DIALLATE | NG/L | 2000. | 30000. (H) |
| EPTAM | NG/L | 2000. | N/A |
| IPC | NG/L | 2000. | N/A |
| PROPOXUR (BAYGON) | NG/L | 2000. | 90000. (G) |
| SEVIN (CARBARYL) | NG/L | 200. | 90000. (B1) |
| SUTAN (BUTYLATE) | NG/L | 2000. | 245000. (D3) |
| **VOLATILES** | | | |
| BENZENE | UG/L | .050 | 5.0 (B1) |
| TOLUENE | UG/L | .050 | 24.0 (B4) |
| ETHYLBENZENE | UG/L | .050 | 2.4 (B4) |
| PARA-XYLENE | UG/L | .100 | 300. (B4) |
| META-XYLENE | UG/L | .100 | 300. (B4) |
| ORTHO-XYLENE | UG/L | .050 | 300. (B4) |
| 1,1-DICHLOROETHYLENE | UG/L | .100 | 7.0 (D1) |
| ETHLYENE DIBROMIDE | UG/L | .05 | .05 G) |
| METHYLENE CHLORIDE | UG/L | .500 | 50. (B1) |
| TRANS-1,2-DICHLOROETHYLENE | UG/L | .100 | 70. (D5) |
| 1,1-DICHLOROETHANE | UG/L | .100 | N/A |
| CHLOROFORM | UG/L | .100 | 350. (A1+) |
| 1,1,1-TRICHLOROETHANE | UG/L | .020 | 200. (D1) |
| 1,2-DICHLOROETHANE | UG/L | .050 | 5.0 (D1) |
| CARBON TETRACHLORIDE | UG/L | .200 | 5.0 (B1) |
| 1,2-DICHLOROPROPANE | UG/L | .050 | 6.0 (D5) |
| TRICHLOROETHYLENE | UG/L | .100 | 50. (B1) |
| DICHLOROBROMOMETHANE | UG/L | .050 | 350. (A1+) |
| 1,1,2-TRICHLOROETHANE | UG/L | .050 | .60(D4) |
| CHLORODIBROMOMETHANE | UG/L | .100 | 350. (A1+) |
| TETRACHLOROETHYLENE | UG/L | .050 | 10.0 (C2) |
| BROMOFORM | UG/L | .200 | 350. (A1+) |
| 1,1,2,2-TETRACHLOROETHANE | UG/L | .050 | 0.17(D4) |
| CHLOROBENZENE | UG/L | .100 | 60. (D5) |
| 1,4-DICHLOROBENZENE | UG/L | .100 | 1.0 (B4) |
| 1,3-DICHLOROBENZENE | UG/L | .100 | 130. (G) |
| 1,2-DICHLOROBENZENE | UG/L | .050 | 3.0 (B4) |
| TRIFLUOROCHLOROTOLUENE | UG/L | .100 | N/A |
| TOTAL TRIHALOMETHANES | UG/L | .500 | 350. (A1) |
| STYRENE | UG/L | .05 | 140. (D5) |

Appendix A

## DRINKING WATER SURVEILLANCE PROGRAM

The Drinking Water Surveillance Program (DWSP) for Ontario monitors drinking water quality at municipal water supply systems. The DWSP Database Management System provides a computerized drinking water quality information system for the supplies monitored. The objectives of the program are to provide:

- immediate, reliable, current information on drinking water quality,
- a flagging mechanism for 'Objective' exceedence,
- a definition of contaminant levels and trends,
- a comprehensive background for remedial action,
- a framework for assessment of new contaminants,
- and an indication of treatment efficiency of plant processes.

### Program

The DWSP officially began in April 1986 and is designed to eventually include all municipal water supplies in Ontario; currently 44 plants are being monitored. Water supply locations have been prioritized for surveillance, based primarily on criteria such as population density, probability of contamination and geographical location.

An ongoing assessment of future monitoring requirements at each location will be made. Monitoring will continue at the initial locations at an appropriate level and further locations will be phased into the program as resources permit. It is estimated that after 4 years of operation, the program will be monitoring 90 locations.

A major goal of the program is to collect valid water quality data, in context with plant operational characteristics at the time of sampling. As soon as sufficient data have been accumulated and analysed, both the frequency of sampling and the range of parameters may be adjusted accordingly.

Assessments are carried out at all locations prior to initial sampling in order to acquire complete plant process and distribution system details, and to designate ( and retrofit if necessary ) all sampling systems and locations. This ensures that the sampled water is a reflection of the water itself.

Samples are taken of the raw ( ambient water ) and the treated water at the treatment plant, and of consumer's tap water in the distribution system. In order to determine possible effects of distribution on water quality, both standing and free flow water in old and new sections of the distribution system are sampled.

Sampling is carried out by operational personnel who have been trained in the applicable procedures.

Comprehensive standardized procedures and Field Test kits are supplied to sampling personnel. This ensures that samples are taken and handled according to standard protocols and that field testing will supply reliable data. All field and laboratory analyses are carried out using "approved documented procedures". All laboratory analyses are carried out by the MOE Laboratory Services Branch.

Data Reporting Mechanism

When the analytical results are transferred from the MOE laboratory into the DWSP system, printouts of the completed analyses are sent to the MOE District Officer, the appropriate operational staff and are also retained by the DWSP co-ordinator.

DWSP INPUTS AND OUTPUTS

The DWSP INPUTS and OUTPUTS are illustrated in Fig. 1.

PROGRAM INPUTS

PLANT AND DISTRIBUTION SYSTEM DESCRIPTION

The system description includes plant specific non-analytical information acquired through a questionnaire and initial plant

visit. During the initial assessment of the plant and distribution system the questionnaire content is verified and missing information added. It is intended that all data be kept current with scheduled annual updates.

The PLANT and DISTRIBUTION SYSTEM DESCRIPTION consists of the following seven components.

1. Process component inventory

All physical and chemical processes that the water is subjected to, from the intake pipe to the consumers' tap (where possible), are documented. These include: process type, general description of physical structures, material types, sizes, and retention time for each process within the plant. The processes may be as simple as transmission or as complex as carbon adsorption.

2. Treatment chemicals

Chemicals used in the treatment processes, their function, application point, supplier and brand-name are recorded. The chemical dosages applied on the day of sampling are recorded in DWSP.

3. Process control measurements

Documentation of in-plant monitoring of process parameters (turbidity, chlorine residuals, pH, aluminum residuals) including methods used, monitoring locations and frequency is contained in

this section. In-plant monitoring results are generally not retained in DWSP but are retained by the Water Treatment Plant.

4. Design flow and retention time

The hydraulic capacity, designed and actual, is noted here. Retention time (the time that a block of water is retained in the plant) is also noted. The maximum, minimum and average flow as well as a record of the flow rate on the day of sampling are recorded in DWSP.

5. Distribution system description

This area includes the storage and transmission characteristics of the distribution system after the water leaves the plant.

6. Sampling system

Each plant is assessed for its adequacy in terms of sampling of bacteriological, organic and inorganic parameters. The prime considerations in the assessment and design of the sampling system are:

i/ the sample is an accurate representation of the actual water condition, eg. raw water has had no chemical treatment;

ii/ the water being sampled is not being modified by the sampling system;

iii/ the sample tap must be in a clean area of the plant,

preferably a lab area;

iv/ the sample lines must be organically inert (no plastic, ideally stainless steel).

It is imperative that the sampled water be a reflection not of the sampling system but of the water itself.

The sampling system documentation includes: origin of the water; date sampling was initiated; size, length and material type (intake, discharge and tap), pump characteristics (model, type, capacity) and flow rate.

7. People

This section contains the names, addresses and phone numbers of current plant management and operational staff, distribution system management and operational staff, Medical Officer of Health and appropriate Ministry of Environment personnel associated with the plant.

FIELD DATA

The second major input to DWSP is field data.

Field data is collected at the plant and from the distribution system sites on the day of sampling. The field data consists of general operating conditions and the results of testing for field parameters. General operating conditions include chemicals used,

dosages, flow and retention time on the day of sampling as well as monthly maximum, minimum and average flows. Field parameters include turbidity, chlorine residuals (free,combined and total), temperature and pH. These parameters are analysed according to standardized DWSP protocols to allow for interplant comparison.

LABORATORY ANALYTICAL DATA

The third major input to DWSP is Laboratory Analytical Data.

Samples gathered from the raw, treated and distribution sampling sites are analyzed for approximately 180 parameters at a frequency of two to twelve times per year. Sixty-five percent of the parameters are organic. The parameters measured may have health or aesthetic implications when present in drinking water. Many of the parameters may be used in the treatment process or may be treatment by-products. Due to the nature of certain analytical instruments parameters may be measured for in a "scan" producing some results for parameters that are not on the DWSP priority list but which may be of interest. The majority of the parameters are measured on a routine basis however, those that are technically more difficult and/or costly to analyse for are done less frequently. These include Specific Pesticides and Chlorophenols.

Although the parameter list is extensive, additional parameters with the potential to cause health or aesthetic related problems

may be added provided reliable analytical and sampling methods exist.

All laboratory generated data is derived from standardized, documented analytical protocols. The analytical method is an integral part of the data and as methods change notation will e be made and intercomparison data documented.

PARAMETER REFERENCE INFORMATION

The fourth major input to DWSP is Parameter Reference Information. This is a catalogue of information for each substance analysed on DWSP. It includes parameter name and aliases, physical and chemical properties, basic toxicology, world-wide health limits, treatment methods and uses. The Parameter Reference Information is computerized and can be accessed through the Query function of the DWSP database.

An example is shown in fig. 2.

A written copy (hard version) of the Parameter Reference Information will be available in the near future and is a new and sophisticated enhancement to the DWSP.

PROGRAM OUTPUTS

There are four major program outputs, Query, Action Alert, Report Generation and the Annual Report.

## QUERY

All DWSP information is easily accessed through the Query function, therefore anything from addresses of plant personnel to complete water quality information for a plant's water supply is instantly available. The DWSP computer system makes relatively complex inquiries manageable. A personal password allowing access into the DWSP query mode in all MOE offices is being developed by the DWSP group.

## ACTION ALERTS

Drinking Water quality in Ontario is evaluated against provincial objectives as outlined in the publication, Ontario Drinking Water Objectives (ISBN 0-7729-2725-1 revised 1983). This publication contains health-related Maximum Acceptable Concentrations for thirty substances. Should the reported level of a substance in treated water exceed the *Ontario Drinking Water Objective* an "Action Alert" requiring resampling and confirmation is issued. This assures that operational staff, health authorities and the public are notified as soon as possible of confirmation of an exceedance and remedial action taken. This report supplies a history of the occurrence of past exceedences at the plant plus a historical summary on the parameter of concern.

In the absence of Ontario Drinking Water Objectives, other agency guidelines which are documented in the Parameter Reference

Information may be used. If these guidelines are exceeded the results are flagged and evaluated by DWSP personnel. An "Action Alert" will be issued if warranted.

REPORT GENERATION

Custom reports can be generated from DWSP to meet the needs of the regions and to respond to public requests.

ANNUAL REPORTS

It is the practice of DWSP to produce an annual report containing analytical data along with companion plant information.

FIG. 1

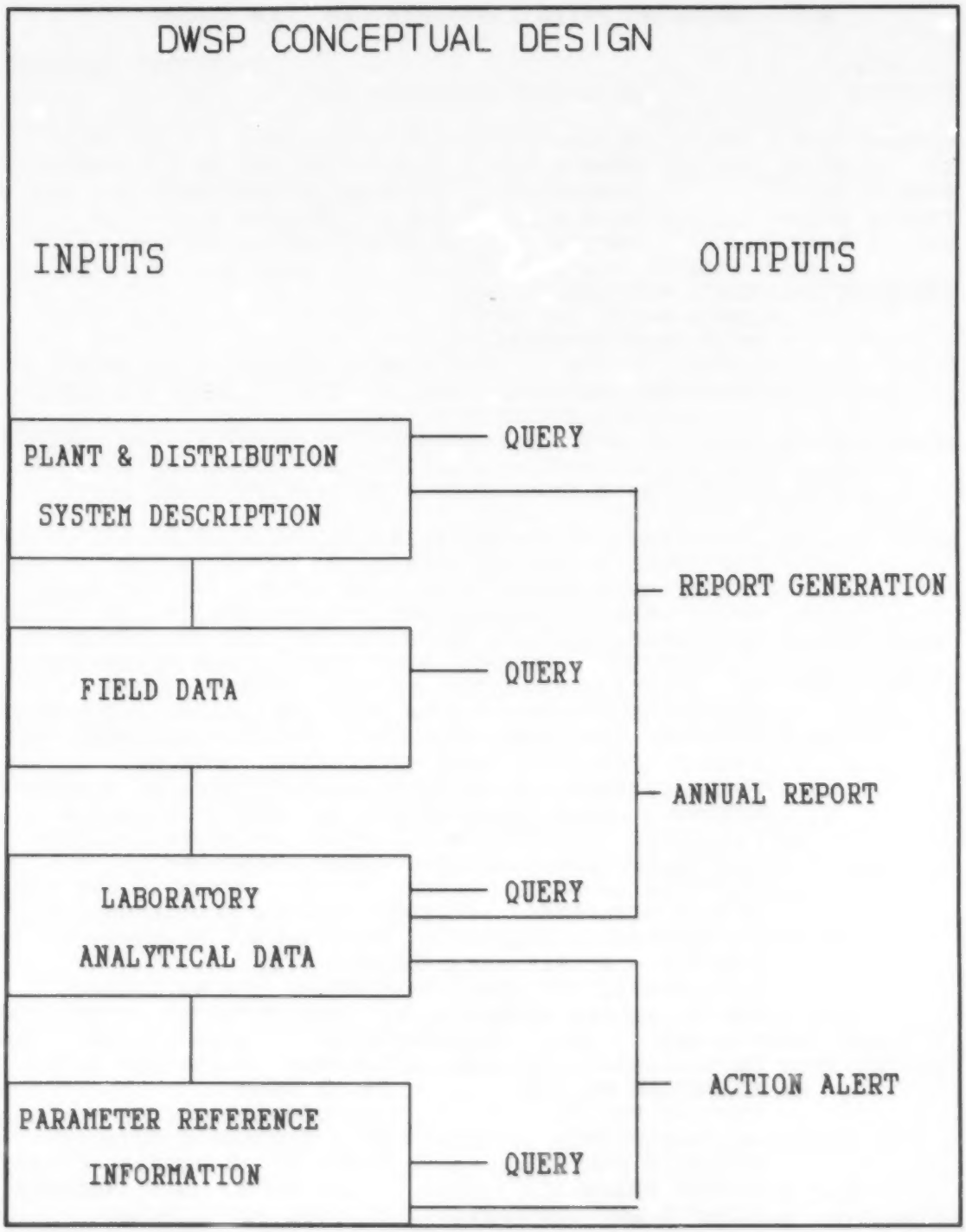

DWSP CONCEPTUAL DESIGN
INPUTS
OUTPUTS
PLANT & DISTRIBUTION SYSTEM DESCRIPTION
FIELD DATA
LABORATORY ANALYTICAL DATA
PARAMETER REFERENCE INFORMATION
QUERY
QUERY
QUERY
QUERY
REPORT GENERATION
ANNUAL REPORT
ACTION ALERT

FIG.2

MOE - DRINKING WATER ASSESSMENT PROGRAM (DWSP)

PARAMETER REFERENCE

(B2001P)
BENZENE

| SOURCE | FROM | TO | METHOD | TARG | UNIT | NOTE |
|---|---|---|---|---|---|---|
| EPA | C 86/04 | | NOMETH | .00 | 063000 UG/L | RMCL |
| EPAA | C 80/11 | | NOMETH | 6.60 | 063000 UG/L | |
| FERC | C 84/05 | | NOMETH | 1.00 | 063000 UG/L | |
| WHO | C 84/01 | | NOMETH | 10.00 | 064000 UG/L | |

DESCRIPTION: NAME: BENZENE
CAS#: 71432
MOLECULAR FORMULAE: $C_6H_6$
DETECTION LIMIT: (FOR METHOD POCODO) 0.05 UG/L
SYNONYMS: BENZOLE, COAL NAPHTHA, CARBON OIL (27), CYCLOHEXATRIENE (41)
CHARACTERISTICS: COLOURLESS TO LIGHT YELLOW, MOBILE, NON-POLAR LIQUID, OF HIGHLY REFRACTIVE NATURE, AROMATIC, VAPOURS BURN WITH SMOKING FLAME (30)
PROPERTIES:
SOLUBILITY IN WATER: 1780-1800 MG/L AT 25 DEG C (41)
THRESHOLD ODOUR: NO DATA
THRESHOLD TASTE: 0.5 MG/L IN WATER (39)
ENVIRONMENTAL FATE: MAY BIOACCUMUALTE IN LIVING ORGANISMS, APPEARS TO BIOACCUMULATE IN ANIMAL TISSUES THAT EXHIBIT HIGH LIPID CONTENT OR ARE MAJOR METABOLIC SITES (LIVER, BRAIN), SMALL QUANITIES EVAPORATE FROM SOIL OR DEGRADE QUICKLY
SOURCES: PETROLEUM REFINING, SOLVENT RECOVERY, COAL TAR DISTILLATION, FOOD PROCESSING, TANNING.
USES: PREPERATION OF ETHYL BENZENE USED AS A STYRENE MONOMER, DETERGENTS, NYLON, AS INTERMEDIATE IN PESTICIDE PRODUCTION, SOLVENT IN RUBBER INDUSTRY, DEGREASING AND CLEANSING AGENT, GASOLINE.
TOXICITY: RATING 4 (VERY TOXIC); ACUTE - IRRITATES MUCOUS MEMBRANES, SYMPTONS INCLUDE RESTLESSNESS, CONVULSIONS, DEPRESSION, RESPIRATORY FAILURE; CHRONIC - ANEMIA AND LEUKEMIA (45).
CARINOGENICITY: HUMAN CARCINOGEN AND MUTAGEN
REMOVAL: GAC ADSORPTION, PRECIPITATION WITH ALUM FOLLOWED BY SEDIMENTATION, COAGULATION AND FLOCCULATION, SOLVENT EXTRACTION, OXIDATION (41).
MOLECULAR WEIGHT: 78.12 GRAMS
MELTING POINT: 5.5 DEGREES C (27)
BOILING POINT: 80.1 DEGREES C (27)
SPECIFIC GRAVITY: 0.879 AT 20 DEGREES C (27)
VAPOUR PRESSURE: 100 MM AT 26.1 DEGREES C
HENRY'S LAW CONSTANT: 0.00555 ATM $M_3$/MOLE
LOG OCT./WATER PAR.COEFF: K=1.0 1/N=1.6 R=.97 PH=5.3

Appendix B

## DWSP SAMPLING GUIDELINE

### i) RAW and TREATED at PLANT

| | |
|---|---|
| General Chemistry | -500 mL clear plastic bottle<br>-rinse bottle with sample three times and discard water<br>-fill to line |
| Bacti | -250 mL clear glass bottle with white seal on cap<br>-do <u>not</u> rinse bottle; preservative has been added<br>-avoid touching bottle neck or inside of cap<br>-fill to top of red label as marked |
| Metals | -500 mL clear plastic bottle with white lid<br>-rinse bottle and cap three times, discard<br>-fill to line<br>-add 10 drops nitric acid<br>(Caution: $HNO_3$ is corrosive) |
| Volatiles (OPOPUP) | -250 mL clear glass bottle<br>-do <u>not</u> rinse bottle<br>-tilt bottle when filling<br>-fill bottle completely; there should be no air bubbles. |
| Organic<br>(OWOC),(OWTRI),(OAPAHX) | -1 liter brown glass bottle per scan<br>-do <u>not</u> rinse bottle<br>-fill to approx. 1" from top<br>-when 'special pesticides' are requested three extra bottles per sample must be submitted |
| Cyanide | -500 mL clear plastic bottle<br>-do <u>not</u> rinse bottle<br>-fill to approx. 1" from top<br>-add 10 drops sodium hydroxide<br>(Caution: NaOH is corrosive) |

| | |
|---|---|
| Mercury | -250 mL clear glass bottle<br>-rinse bottle and cap three times, discard then fill to top of label<br>-add 20 drops each nitric acid and potassium dichromate<br>(**Caution:** $HNO_3$ and $KCrO_7$ corrosive) |
| Phenols | -250 mL clear glass bottle<br>-do <u>not</u> rinse bottle<br>-fill to top of label as marked |

<u>Steps</u>

1. Let cold water tap run for several minutes.
2. Record time in submission sheet.
3. Record teperature on submission sheet.
4. Fill up all bottles as per instructions.
5. Record chlorine residuals (free, combined and total for treated water only), turbidity and pH on submission sheet.

ii) Distribution Samples (standing water)

| | |
|---|---|
| General Chemistry | -500 mL clear palstic bottle<br>-rinse bottle with sample three times and discard<br>-fill to line |
| Metals | -500 mL clear plastic bottle with white lid<br>-rinse bottle and cap three times, discard<br>-fill to line<br>-add 10 drops nitric acid<br>(Caution: $HNO_3$ is corrosive) |

Steps:

1. Record time on submission sheet.
2. Place bucket under tap and open cold water.
3. Fill to predetermined volume.
4. After mixing the water, record the temperature on the submission sheet.
5. Fill general chemistry and metals bottles.
6. Record chlorine residuals (free, combined and total), turbidity and pH on submission sheet.

iii) Distribution Samples (free flow)

| | |
|---|---|
| General Chemistry | -500 mL clear plastic bottle<br>-rinse bottle with sample three times and discard water<br>-fill to line |
| Bacti | -250 mL clear glass bottle with white seal on cap<br>-do <u>not</u> rinse bottle; preservative has been added<br>-avoid touching bottle neck or inside of cap<br>-fill to top of red label as marked |
| Metals | -500 mL clear plastic bottle with white lid<br>-rinse bottle and cap three times, discard<br>-fill to line<br>-add 10 drops nitric acid<br>(Caution: $HNO_3$ is corrosive) |
| Volatiles (OPOPUP) | -250 mL clear glass bottle<br>-do <u>not</u> rinse bottle; preservative has been added<br>-tilt bottle when filling<br>-fill bottle completely; there should be no air bubbles |
| Organic (OWOC),(OWTRI) | -1 liter brown glass bottle per scan<br>-do <u>not</u> rinse bottle: preservative has been added<br>-fill to approx. 1" from top |
| Cyanide | -500 mL clear plastic bottle<br>-do <u>not</u> rinse bottle: preservative has been added<br>-fill to approx. 1" from top<br>-add 10 drops sodium hydroxide<br>(Caution: NaOH is corrosive) |
| Mercury | -250 mL clear glass bottle<br>-rinse bottle and cap three times, discard then fill to top of label<br>-add 20 drops each nitric acid and potassium dichromate<br>(Caution: $HNO_3$ and KCrO7 corrosive) |

**Steps:**

1. **Record time on submission sheet.**
2. **Let cold water flow for five minutes.**
3. **Record temperature on submission sheet.**
4. **Fill all bottles as per instructions.**
5. **Record chlorine residuals (free, combined and total), tubidity and pH on submission sheet.**